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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Governor's Speech.

ONE of the most important events of the month was the opening of Parliament on 24th August by his Excellency the Governor, Sir John Goodwin. There was much to interest agriculturists in his Speech, in the course of which reference was made to many of their industrial activities.

"The dairying industry," said the Governor, "continues to advance on the technical side, and this is evidenced by the considerable capital that is being devoted to the renovation or rebuilding of factories, with the consequent improvement of plant. The successes obtained by Queensland manufacturers in competition with other States and countries during the past few years have placed Queensland definitely in the forefront with the leading butter-manufacturing countries, while Queensland still continues to maintain its position as the premier cheese-producing State of the Commonwealth.

"The sugar manufactured from last season's crop amounted to 376,000 tons, the previous crop being 467,000 tons. As a result of this reduction in the output, a higher percentage of the sugar was consumed in Australia, and this fact, together with the enhanced price obtained for the exported surplus, enabled an average price of £24 10s. 10d. per ton to be paid to the producer. As a continuance of the policy

of safeguarding the interests of the producers of sugar, the crop for the current season has been acquired under the provisions of the Sugar Acquisition Act of 1915. It is anticipated that the yield of sugar in Queensland for the present season will be about 430,000 tons. In 1920 the area cultivated for cane was 162,619 acres, while to-day it is nearly 300,000 acres, and the number of growers of cane since 1920 has increased by 70 per cent.

"Considerable attention has lately been given to the utilisation of the by-products of the sugar industry, and, with the assistance of the Queensland Government, a power alcohol distillery has been established at Plane Creek, near Mackay, where molasses is now being turned into power spirit, and this factory will doubtless be followed by others.

"The manufacture of celotex from megasse, another by-product of the sugar industry, promises to develop into a most important industry in Queensland. It is estimated that the amount of dry megasse produced yearly by the Queensland sugar mills is nearly 500,000 tons, which would make an enormous quantity of celotex board. The board is lighter than timber, and it is especially suitable for tropical buildings. Thus megasse, hitherto burnt for fuel in the sugar mills, can become a highly valuable product of enormous benefit to the sugar industry.

"In practically every district," continued His Excellency, "from the Southern coastal border to the Far North, good crops of maize were obtained, and the aggregate yield is estimated to reach 4,000,000 bushels of good quality grain.

"For the first time in the history of the cotton industry, the whole of the crop this year will be consumed within the Commonwealth. This condition is likely to continue and should result in the industry being placed on a profitable basis for the grower.

"The scourge of Bunchy Top in banana plants is still a subject of concern, but it is anticipated that the close application of the conditions imposed on infested areas, which are being carefully watched by departmental officers, will effect complete control of the disease.

"The policy of my advisers in encouraging and assisting primary producers to organise continues to meet with success.

"At the present time eleven-twelfths of the value of the agricultural products of Queensland are marketed through a co-operative system under the control of the producers themselves. It has been estimated that during the financial year that has just closed the value to the agriculturists of Queensland in the increased returns as a result of co-operatively controlled marketing exceeded £1,000,000 sterling."

Other matters to which reference was made in the Speech included the Faculty of Agriculture, Settlement of the Mount Abundance, Upper Burnett, and Callide Valley lands, developmental roads in rural districts, the establishment of a butter factory at Silkwood, the Dawson Valley irrigation project, and the vigorous methods employed in pest eradication.

Among new measures forecast are—A Rural Fires Bill, a Land Acts Amendment Bill, Agricultural Townships Bill, a Wheat Pool Acts Amendment Bill, and a Fruit Cases Bill.

Fostering Queensland Industries.

IN the course of a notable speech at the official opening of the Brisbane Show the Deputy Premier, Mr. Forgan Smith, emphasised that it was the duty and privilege of every Government to help to foster industry in every manner possible, but the impetus to make industrial operations a success must inevitably come from

those who were engaged in those industrial pursuits. He paid a tribute to the unselfish work being performed by the Royal National Association, which, from the point of view of service to the community, was performing a great work for Queensland. They often heard the remark, "That is near enough"; but nothing but the best was good enough for Queensland. To maintain the high standard of living that had been set in Australia in those industries which were the subject of international competition it was necessary that they should have the highest standard of efficiency and production. From this point of view wonderful things had been achieved in Queensland. In the sugar industry, for instance, Queensland made a ton of sugar out of less cane than any other country in the world. This was due to improvement on the farming and milling side. In 1914 the amount of cane to a ton of sugar was 9.20 tons, but the average now was 7½ tons. In conclusion, the Deputy Premier emphasised that the parliamentary standards should be high, and that its authority should be maintained. "Let us, as individuals," he concluded, "while demanding a high standard in Queensland and Australia, see to it that we, as citizens, each in his allotted sphere of activity, work to make Queensland what it should be."

"Undefeatable"—The Queensland Spirit.

IN the course of a short Press interview in the ring at the recent Brisbane Show, the Governor, Sir John Goodwin, said that he was delighted with the wonderful horsemanship and jumping demonstrated in the Queensland Champion District Hunters' competition. "I wish," he added, "I could have that field in some of the hunting districts in England. It was a wonderful demonstration."

Discussing the Show results generally, the Governor said he was immensely pleased with the variety and extent of the exhibits. He and Lady Goodwin had spent several very pleasant days inspecting the several sections of the Show, and he hoped that next year he would be able to forego the whole of his public engagements so that he might devote his entire attention to the exhibition. "There is one thing," said his Excellency, "that impressed me very deeply, and that is that the people of Queensland, in spite of the uncertainty of the seasons, are undefeatable. Such a spirit and such co-operation must overcome all difficulties and promote solid national prosperity."

The Queensland Tropics—"Like being in Fairyland."

EVERY year an increasing number of southerners come north seeking the sun, and the impressions of their visit are invariably appreciative. This is what a notable visitor, Reverend Dr. R. Scott West, Moderator-General of the Presbyterian Church in Australia, said at Toowoomba recently: He had been impressed with the unbounded hospitality of Queenslanders. It had been a real joy travelling up and down Queensland. Travelling in North Queensland was like being in fairyland. He believed that the scenery there was equal to anything in the world, and he had travelled a great deal and knew a good many countries.

Queenslanders had shown, he thought, a lack of enterprise in not advertising this wonderful country. He had also been impressed with the physique of the people and the beauty of the little children, and he had no doubt as the years went by that they would develop a virile race.

He had been delighted with the people of Cairns and Atherton, and had been impressed with the courage, heroism, and vision of the people in the face of adverse circumstances in that area in the Central West affected by a seasonal set-back.

Bureau of Sugar Experiment Stations.

ENTOMOLOGICAL HINTS TO CANEGROWERS.

By EDMUND JARVIS, Entomologist.

White Ants Attacking Cane Sticks and Sets.

Damage caused by white ants consists in destruction by the worker and soldier forms of a community of (1) newly planted sets and young shoots arising from same, (2) invasion of the sets and growing cane-sticks from below ground level, or (3) ultimate removal of the entire internal cellular tissue of the sticks, thus reducing such canes to mere hollow tubes, nothing being left of them except the rind.

To control this pest on badly infested land, it is advisable to fumigate the soil with carbon bisulphide or paradichlorobenzene; applying ¼-oz. doses injected 18 inches apart, 6 inches from the plants, and at a depth about level with the sets.

When treating young plant cane be careful not to apply such fumigants closer than 6 inches from sets, and in the case of bisulphide direct the doses parallel to the cane rows, *not towards the plants*. The vermorel "Pal Excelsior" soil injector has proved satisfactory in field work. Secondly, locate position of nest or termitarium if possible, in old stumps, roots, &c., chancing to have been left in the canefield, or in fallen or standing timber occurring close to headlands, and fumigate same when practicable with Shell benzine, Cyanogas, &c. Thirdly, smear poison bait (2½ oz. sodium arsenite mixed with 1 quart of mill molasses) on infested fence posts, pieces of wood or cane, &c. (to act as poison baits on headlands or amongst affected cane plants). Fourthly, avoid planting sets obtained from termite-infested localities.

How Growers Can Check the Weevil Borer.

During the cutting period one has a chance to locate the exact whereabouts of the cane beetle *Rhabdocnemis obscurus* on cane areas affected by this pest. The position of any infestations occurring perhaps for the first time should be carefully noted, and the Entomologist at Meringa Experiment Station advised without delay. Tachinid parasites of this weevil borer will be liberated by the Sugar Bureau free of cost on such affected cane land, on the condition that the grower concerned will agree to leave at least a quarter of an acre of badly bored cane for these parasites to breed in; this area should be allowed to remain uncut for three months or longer, and must on no account be burnt.

One cannot expect to successfully establish these useful parasites unless they be carefully looked after and given a chance to multiply. Indiscriminate burning of the cane in which they have commenced to breed is one of the chief causes of failure to secure the permanent benefit which should necessarily result from liberations of this tachinid fly.

Protect Your Insect Friends.

Do not destroy the soil-frequenting larvæ of beneficial insects that happen to be parasitic or predaceous on cane grubs. Some of the commonest of these may be easily recognised by the following brief descriptions and accompanying illustrations:—

(1) White, maggot-shaped inactive larvæ about an inch long, which when ploughed up are sometimes found attached to dead or dying cane grubs (Fig. 1). These spin cocoons (Fig. 2) from which emerge digger-wasp parasites.

(2) Dark-brown cocoons, from ¾ to 1½ inch long, composed of silk hardened to the stiffness of paper (Fig. 2). These are often exposed by the plough, and contain either male or female digger-wasps (Fig. 3).

(3) Shining white maggots, about 1½ inches in length, but more slender than those of Fig. 1, and able to tunnel with ease through soil by means of a pointed beak (Fig. 4). These predaceous larvæ of robber-flies (Asilidæ) pierce and suck the life juices of various cane grubs.

(4) Large flattened wireworms (Fig. 5), from 1 to 2 inches or more long, having yellowish-brown shining bodies and six small legs close to the head end. These slippery, very active creatures remain in the ground two years or longer before transforming into beetles. They are inveterate enemies of cane grubs, seizing them with their sharp sickle-shaped jaws and then cutting deeply into the body and greedily imbibing its succulent contents.

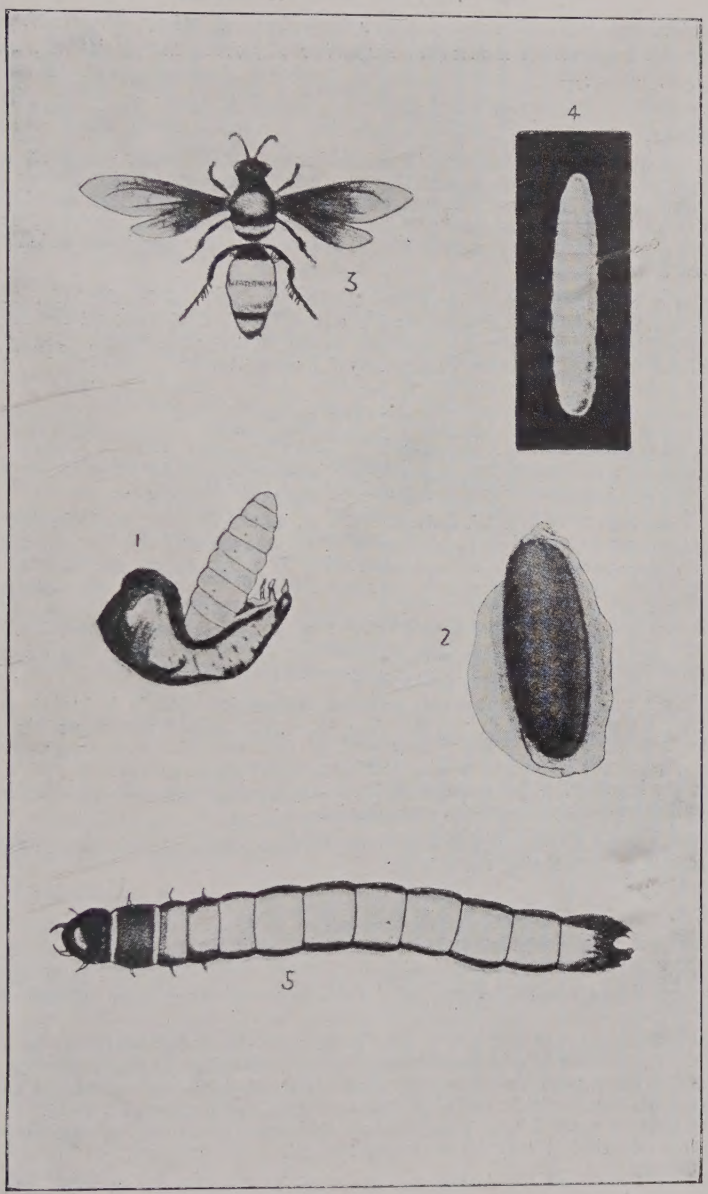


PLATE 55.

Fig. 1.—Mature maggot of digger-wasp attached to shrunken body o cane grub.

Fig. 2.—Cocoon of digger-wasp, spun by maggot.

Fig. 3.—Digger-wasp (*Campsomeris tasmaniensis*).

Fig. 4.—Soil-frequenting maggot of Robber Fly; predaceous on cane grubs.

Fig. 5.—Soil-frequenting larva of elaterid beetle; predaceous on cane grubs.

TOP ROT IN SUGAR-CANE.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following notes (8th August, 1927) from the Assistant Pathologist, Mr. E. J. F. Wood:—

Investigations to Date.

This disease, which for a long time was known as Burdekin Top Rot, or simply as Burdekin Rot, has caused considerable losses to the farmers of the Lower Burdekin district, and as yet little information of a definite nature has been obtained. This is an attempt to present the facts which are known at the present time, as well as certain theories which the farmers have put forward, and a few ideas which commend themselves to me.

Hitherto the trouble has been practically confined to Badila (N.G. 15), but smaller occurrences have been seen by the author in D. 1135 (not on the Burdekin), M. 1900 Seedling, and rarely in H.Q. 426, where it was very slight. Many farmers have observed it in Rose Bamboo and Striped Singapore.

Cause.

The casual organism was suggested by Mr. Tryon as a septate fungus which he identified on mycelial characters as a Pythium, and which he stated attacked the roots of the cane, the Top Rot being, in his opinion, merely subsidiary.

At the end of 1925, Mr. W. Cottrell-Dormer, of the Bureau, while in Ayr, carried out investigations as to the cause of Top Rot. He has ascertained that the red streaks noticed on the cane leaves are associated with Top Rot as an earlier stage of the latter and that these red-streaked portions contain bacteria. He cultured these bacteria, and by infection of healthy plants with material from these cultures produced the typical red streaks, and later Top Rot as it occurs naturally. He has thus shown that Top Rot is caused by bacteria as the active agent, though there still remains the larger part of the problem—what are the primary factors?

His work was carried out under extreme difficulties, and it is highly creditable to him that he achieved such results with the very limited means at his disposal. Owing to lack of time he did not succeed in isolating the causative organism in pure culture, so that its cultural characteristics still remain a mystery, and we do not yet know its identity. The main object of his investigation, the production of the disease with a culture of bacteria, was obtained.

The symptoms of the disease have been discussed in his work on the subject, so it is unnecessary to mention them here.

Seed Cane.

It has been established beyond doubt that infected plants do not produce infected cane in the resulting crop, and that cane from clean fields will often show up infected in the plant crop. Infected plant cane may give rise to healthy ratoons and vice versâ.

One experiment conducted by Mr. Tower, of Jarvisfield, will be sufficient to illustrate this. Warned by some farmers against planting diseased sets, he selected some diseased and some healthy cane from different fields and planted them beside each other. In the resulting crop both showed equal amounts of Top Rot. Of course, secondary infection could have taken place in this case, but so many other experiments support this one that it may be taken as typical.

Again, a farmer on the Anabranch procured healthy Badila in 1920, and planted it on virgin soil. The resultant crop was about 5 per cent. Top Rot. Next year Top Rot was bad in patches, which died right out. Since then the cane has been healthy till this year, when some Badila plant on new soil is showing bad patches of Top Rot. Farmers all over the district have quoted similar cases.

Conditions of Cultivation on the Burdekin.

As Top Rot is epidemic only on the Burdekin, it will be well to recapitulate the methods of cultivation there, as it seems probable that they have some bearing on the trouble.

As a rule there is a definite wet season at the beginning of the year, with dry weather except for a few isolated rains during the year. It is therefore necessary to water the cane during growth, and this is done by water pumped on to the fields

by means of spear pumps. This is done at intervals, and often when rain is expected the irrigation is deferred. Sometimes the rain does not come, and the cane is badly checked. On the other hand, irrigation may be followed by a storm and the ground flooded. So that these conditions are rather unnatural and must be considered in connection with the disease.

It is unusual to ratoon the cane, and plant crops are the rule. On some places first, and on a few second and third ratoons are grown.

In this connection it must be noted that although the cane may be regularly watered, the atmosphere remains dry, and this may be playing a big part in the conditions controlling Top Rot.

Losses Due to the Disease.

These are at times heavy. A crop estimated at 32 tons per acre, grown at Macdesme, became infected and cut 15 tons. Another estimated at 28 tons cut 14 tons. There are farms on the Burdekin which rarely, if ever, are affected, and on many farms infection seems to occur on the same block to a greater extent than on other adjacent blocks.

The farmers are unanimous in stating that they think the trouble to be due to seasonal variations, for in some years there is hardly any loss due to Top Rot, while the next year may show a general infection throughout the district. This appears to point to the fact that there are a number of complex factors involved, as no simple relation between season and disease can be found. A general hypothesis based on the evidence obtained will be given, but it must be remembered that it is probable that it will have to be modified as other facts come to light.

Distribution.

The whole of the Burdekin district is affected to some extent, Badila being the main variety affected. As most of the land is too rich for other canes, which grow rank and lodge, this is serious, and it is hoped that the South Johnstone seedlings will show some resistance to Top Rot and will be able to be used to replace Badila.

Mr. Gibson reports that Top Rot is occasioning some damage at Freshwater, and this is of interest, as it may help to throw more light on the trouble.

Top Rot occurred on the Experiment Station at Mackay after the heavy rains that followed the 1902 drought and wiped out half the Rose Bamboo on the place (I quote "The Director"). It has also occurred on the Herbert, and I have seen signs at Beenleigh during heavy rains following a drought.

Period of Infection.

This is roughly from November to the end of February, and there are two stages of infection:—

(1) When the plant is just beginning to make cane the outer leaves show red streaks, and soon the centre rots. This usually occurs in the leader or first shoot and causes little loss, for the cane stools out from below, and as there are about fifty shoots in each stool, of which only about twenty ever come to maturity, the loss is not noticeable.

(2) The other occurs when there is about 3 to 4 ft. of cane. The red streaks appear, the top dies and rots, and the cane usually side-shoots and may sucker. The cane is healthy below the localised rotted portion and is millable, and can be used for plants.

Possible Theories as to the Immediate Cause.

It has been suggested that the disease is due to the running out of Badila, but this theory is disproved by the fact that the comparatively recently introduced Oba Badila shows Top Rot, and in the Tableland Badila many farmers have reported exceptionally heavy losses. Also the appearance of the trouble in E.K. 28 and M. 1900 Seedling and Q. 813 goes against this theory.

The evidence given above shows that Top Rot is a disease markedly different from the type of disease known as Vascular Disease, which includes Gum and Leaf Scald, likewise bacterial diseases, so that seed selection, the main control measure for these, will not apply in this case.

Another peculiar thing is that from the centre of infection the rot proceeds only for a few joints down the stem and the rest of the stick remains healthy.

Mr. Cottrell-Dormer has given us a bacterial origin for Top Rot, and it remains for us to clear up the factors which control the virulence of this parasite, and also to gain some further knowledge of its habits.

From the attacks in other places we must presuppose the presence of the bacterium over a wide area, and that it requires certain attendant factors for its appearance in epidemic proportions. There is apparently either a case of very balanced parasitism or of a facultative parasitism by an organism which is usually harmless. This will have to be determined in the laboratory, and in the course of these investigations we may be able to derive the source of the organism.

For this there are several possibilities—

(1) That they exist in the soil and are carried up with the cane.

(2) That they exist in the water used for irrigation.

(3) That they are borne by the wind or by insects from plant to plant.

None of these possibilities have been disproved, but No. 2 is unlikely, as there is no irrigation in other districts, and owing to the fact that the young leaves are rarely covered with water during irrigation. Cultural work will perhaps discriminate between these points.

We have, again, a question of resistance and susceptibility, as Badila is susceptible and H.Q. 426 tolerably resistant. Some factor such as the shape of the leaves or their texture may be at work here.

Many farmers hold the opinion that it is a seasonal trouble, but it is peculiar that in the same farm some fields will be affected and others not; then in the next year the uninfected fields may show infection, though it seems, as mentioned above, that certain paddocks show bad infection from year to year.

It seems a plausible theory that rapid growth of a tender growing point after a check allows the bacteria, ready in the crevices of the spindle, to obtain a footing.

The farmers have been asked to give data and to try to clear this point. The case at Mackay and that at Beenleigh fit in with this theory, and many farmers concur with it.

The check may be produced in two ways on the Burdekin—

(1) By rains following a drought, or a period in which the cane has not been watered.

(2) By heavy irrigation after a time when the irrigation has been light or after the cane has begun to wilt. It was ascertained, in conversation with the cane inspector of Pioneer, that on the farms which water regularly the outbreaks of Top Rot are at a minimum.

The following data were obtained from Mr. Munro, of the State Farm at Home Hill, who is, in addition, carrying out experiments in order to supplement them:—

FIELD No. 6—Season 1926-27. Area, 5.7 acres.

Month.	Gallons of water applied.	Rainfall in inches.
June, 1926	680,000	0
July	40,000	0
August	568,000	0
September	0	4.42
October	160,000	0
November	60,000	0.07
December	815,000	3.26
January, 1927	10,000	17.58
February	0	9.73
March	356,000	1.52
April	278,000	0
May	577,000	0
June	0	4.82
July	0	2.74

Top Rot appeared in December and January—i.e., after a watering of 60,000 gallons and .07 in. of rain, followed by 815,000 gallons and 3.26 in.

Here we have definite evidence of a check followed by a drenching and the coincident appearance of Top Rot. As, however, this is an isolated case, care must

be taken against drawing any definite conclusions from it, but it certainly seems to fit in with the general hypothesis enunciated above. It is hoped that more data of the same nature will be established at a later date. Any farmers who can supplement these figures are requested to do so.

The farmers on the Burdekin are to be circularised and asked to give a report on a printed form on the times of watering, and as far as possible the amounts of water used, for it is recognised that it is not possible to give an even distribution of water on a field, except in a few cases and in the case of small fields. This will take at least a year to accumulate, but it is hoped that they will prove of value from the practical standpoint, or, at any rate, till the theoretical can be taken up and followed to its conclusion.

CANE PEST COMBAT AND CONTROL.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has made available the following report from 15th July to 14th August, from the Entomologist at Meringa, near Cairns, Mr. E. Jarvis, in connection with the control of cane beetles.

Direction of Flight Affected by Topographical Conditions.

Judging by observations made by the writer during 1915 to 1918 it appears very probable that the character of the forest land on both sides of the Mulgrave River, extending from Gordonvale to Deeral, is probably responsible for the invasion of our district by the greyback cockchafer (*Lepidoderma albohirtum*).

Infestation of cane lands around the Mulgrave, for instance, was apparently affected by beetles that did not originate in that locality, but migrated there from extensive breeding grounds lying to the south of Aloomba, between the Malbon Thompson Range and the mountain chain which terminates on the north in Walsh's Pyramid.

Fully one-third of this area of about eighty square miles consists of reserved land, in the vicinity of Tringilburra and Fishery Creeks, which supports patches of virgin scrub and is for the most part uncleared.

Now, the topography of the country in question chances, unfortunately, to favour a north-westerly migration of these beetles, as owing to the position of the Malbon Thompson and Pyramid Ranges the south-east trade wind—being unobstructed in its course—naturally offers every facility for the gradual transportation of quantities of greybacks breeding throughout this vast area towards Gordonvale and adjacent sugar-growing localities.

Flight in an easterly or westerly direction being opposed by mountain barriers, these beetles, after skirting along the base of the ranges, would tend to arrive in greatest numbers at Walsh's Pyramid, from which point the cane lands of Aloomba are only about 1½ mile distant, and in the direct line of migration.

Invasion of this district appears to have followed as a matter of course, about the year 1895, and at first the pest was satisfied to breed among the roots of native food-plants; its grubs, as a matter of fact, having been noticed to occur very plentifully under "blady grass" (*Imperata arundinacea*), which at that time covered large spaces of forest land around Aloomba and Behana.

Influences Responsible for Migration.

The natural laws which govern the migration of certain classes of insects are too varied and complex to deal with in a report of this kind. Such insects, however, including our greyback cane-beetle (when chancing to multiply abnormally over restricted areas) being instinctively aware of the increased danger that invariably threatens crowded numbers, generally seek to migrate when possible in order to ensure wider distribution of their eggs, and establishment of their grubs or larvæ in different classes of soil, thereby reducing the percentage of mortality likely to be caused by birds, parasitic insects, and other natural enemies.

As pointed out in my last monthly report the cockchafer beetle in question, although of somewhat bulky proportions, is well adapted structurally for aerial transportation; in short, it seems likely that its occurrence locally in concentrated numbers should be attributed mainly to influences of a meteorological nature operating in conjunction with such factors as (1) the mechanical condition of soil; (2) character and disposition of timber or feeding trees; (3) the geographical situation of our high lands and mountain ranges, &c.

Growers should bear in mind that the migratory flight described above, has nothing to do with that of the egg-laden females occurring about a couple of weeks later. In the former case—which may be considered as being an irresponsible dispersion or exodus towards fresh breeding grounds—the newly emerged beetles of minimum weight are able to travel considerable distances; whereas the flight, or in many cases invasion of cane lands by mature females seeking to deposit their eggs, must necessarily be far more restricted. An important point, often lost sight of, is the fact that there is always a danger after such invasion that the affected locality may chance to prove a suitable breeding place for the pest, in the event of which it may subsequently become permanntly grub-infested. On the other hand, incursions of a temporary nature may take place, owing to the position of certain feeding-trees or the occurrence of high land in the near vicinity of a plantation happening to arrest the flight of gravid females. In such cases, however, these beetles may not breed there the following season, but pass on to fresh fields.

Reflection upon the significance of the above mentioned influences affecting the aerial movements of our greyback cockchafer naturally leads one to the consideration of the question of its food-plants in relation to grub attack.

When to Destroy Feeding-trees of the Beetle.

In the event of a belt or clumps of timber containing food-plants of the beetle chancing to occur in the midst of, or to separate two adjacent plantations, and to lie in a south-westerly situation about a mile from the southern headland, such trees should be cut down. Similarly, when either one or opposite sides of an area of cane land happen to run in a south-east direction and be closely bounded by forest country, it is often advisable to cut out all feeding-trees, &c., growing near such headlands to a distance of about half a mile from the nearest rows of cane.

On the other hand, when the southern edge of a canefield is bounded closely by forest land extending far to the southward it is not advisable to clear a belt of timber back from such headlands, or to cut down the feeding-trees.

Should grubs occur over an area of cane land chancing to be more or less surrounded on all quarters except the south by timbered mountain ranges, destruction of the food-plants of this bettle would, if practicable, not only entail considerable labour and expense, but be likely in many cases to prove ineffectual as a control measure. Such cul-de-sacs or small pockets usually become grub-affected in the first place as a result of the arrival of beetles migrating from the south-east, which are forced to come to rest upon timber fringing the base of these ranges. Finding the situation suitable for breeding purposes, and that further progression towards the north, east, and west is more or less obstructed by mountainous country, they generally become established in such localities and regularly damage the cane each season.

In permanent infestations of this kind the best plan is to prevent excessive multiplication of the beetles by collecting them durng the so-called flighting period, either from native food-plants or from trap-trees grown especially for this purpose, and by picking up the grubs during the course of cultural operations.

By exercising common-sense methods of this sort it should be possible on such cane areas to ultimately reduce the grub pest to harmless proportions, seeing that the fields are practically closed from further invasion from all quarters but the south.

The Director of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) has received the following report (23rd July, 1927) from the Entomologist at Meringa, near Cairns (Mr. E. Jarvis), dealing with (1) various influences affecting the numerical increase of the greyback cockchafer during the period of its aerial existence; and (2) activities of the Meringa Experiment Station for the past month, June to July, 1927.

THE GREYBACK COCKCHAFER.

(1) Hints on Control Derived from Study of the Organs of Flight.

Our canegrowers have often displayed curiosity regarding the probable range of flight of our principal cane beetle, being anxious, perhaps, at times to satisfy themselves that no danger of grub-infestation need be feared from the presence of belts of timber chancing to occur in the vicinity of their cane land, which might contain feeding-trees of the beetles.

Egg-laden females of *albohirtum*, however, probably seldom fly, at a single stretch before coming to rest, farther than about one-half to three-quarters of a mile;

and should obstacles, such as high ground (volcanic ridges) or well-grown ratoon or standover crops of cane be encountered in their line of flight the beetles, instead of continuing on the wing, are far more likely to remain and oviposit in such situations. In the event of a plantation of young cane from 6 to 12 inches high happening to lie between them and a block of standover cane they will generally pass over the former and come to rest amongst the older mature crop.

Evidence of such selection is not uncommonly met with, and doubtless affords an explanation at times as to the reason why (some months later) one notices the cane on certain areas succumb entirely to grub injury, while that alongside, divided from it by only a few feet and growing on the same land, remains quite free from attack.

Up to the present no experiments on an extensive scale have been undertaken by us to determine the average distance our greyback is able to travel. The question, after all, is not one of great economic importance, and can be approximately decided without having recourse to experiments which would necessarily be of a costly nature.

With regard to the flight of the female when ready to oviposit, we may reasonably assume that the distance it would be likely to fly would be much the same as that traversed under similar circumstances by the common European cockchafer, *Melolontha* (*vulgaris*) *melolontha*.

Queensland and European Cockchafers Compared.

This latter beetle, *M. melolontha*, which is similar in size to our own *albohirtum* (1¼ inch long), and belongs to the same sub-family *Melolonthidæ*, is of a light-brown colour with a series of little white triangular marks along the sides of the body. (See Figs 1 and 3 of this species and its grub on the accompanying plate.)

So closely is this European insect related to our own greyback cockchafer, that, while the latter species (as observed by the writer during the last twelve years) lives only three or four weeks, we find that the adult *Melolontha melolontha* (according to Labitte) lives for thirty-one days; so that the longevity of these two cockchafers during their aerial existence is practically the same. It is interesting to note that in Germany experiments have demonstrated that *M. melolontha* is unable to fly a greater distance than 1,100 to 1,650 yards before coming to the ground.

Judging by the scanty data obtained by us in this connection it appears probable, therefore, as already mentioned, that the above distance would be likely to apply also to the flight of egg-laden females of our own cockchafer, *albohirtum*.

Record Capture of 15,000 Tons of Cockchafers.

It should be mentioned, as a further illustration of the similarity of habit between the two species of beetles in question, that in 1866 the authorities of the Seine Inferior (as reported by Edward Step, F.L.S.) estimated the loss to the growers from the grubs of *melolontha* at about £786,000. In Saxony, two years later, 15,000 tons of the beetles were collected and paid for, and it was found that the total number thus destroyed was not fewer than 1,500,000,000 of cockchafers. Some idea of such a vast number may be realised from the fact that these beetles, if placed end to end in close contact, would be sufficient to encircle the entire world in an unbroken line around its circumference at the equator, which is 24,000 miles; and there would still remain enough additional beetles to extend this distance for another 4,000 miles if needs be.

We Must Protect our Insectivorous Birds.

The chief reason for British immunity during most seasons from such serious grub damage as occurs on the European continent, is to be found, it is stated, in the protection and love manifested by English people for the birds which help to keep down the numbers of these chafers. Queensland growers would do well to cultivate a similar regard for the numerous species of birds which help so greatly to thin the ranks of our most formidable beetle pest.

In England, owls, nightjars, and bats destroy great numbers of cockchafers, and it is said that starlings may be observed at the time when these beetles are emerging from the soil watching for them to crawl up into daylight so that they might capture and eat them. Rooks, on the other hand, do not wait for development of the beetle condition, but are said to plunge their bills into the ground and drag out the mature grubs.

PLATE 56.

THE EUROPEAN COCKCHAFER COMPARED WITH OUR QUEENSLAND "GREYBACK," TOGETHER WITH WINGS AND ELYTRA OF OUR CHIEF CANE BEETLES.

(*For description of plate, see page* 215.)

Powers of Flight Dependent on Structure of Exo-Skeleton, &c.

Special attention has been given by the writer to the external anatomy of our greyback cockchafer, which seems, indeed, to have been specially fitted by nature for wide dissemination or aerial transportation. In addition to exceptional lightness in weight, careful provision has been made for periods of extended flight; the wing-cases of elytra (Fig. 9 on plate) which are unusually light in proportion to their size, being deeply concave below, so that while the beetle is using its powerful wings its elytra project laterally, parachute-like from each side of the body, thus aiding the insect to maintain a steady course, and also giving it buoyancy.

A greyback beetle weighs little more than 1½ scruples when alive, and a dried specimen only 10 grains (¼ scruple).

Although *Anoplognathus boisduvali* turns the scale at 7 grains (a dried specimen) and possesses but two-thirds of the bulk of the latter insect, the wing surface of *albohirtum* is 836 sq. mm., and that of *boisduvali* 450 sq. mm. (much smaller proportionally than in *albohirtum*).

By comparing the wings and elytra of our scarabæid cane beetles (shown on the plate) it will be noticed that *Lepidiota consobrina* Gir. comes next in size to *albohirtum*, with a wing surface of 750 sq. mm., its body weighing a little less than that of the greyback.

Lepidiota caudata (Figs. 7 and 10) is apparently more fitted for aerial progression than *L. consobrina*, being lighter than that insect in proportion to its bulk, while possessing also broader elytra, and nearly the same wing expanse.

Lepidiota frenchi is just half the weight of *albohirtum*, but has a superficial wing measurement of 540 sq. mm., which happens to be greater in proportion to its bulk than that of the greyback. Owing to its erratic aerial movements, however, which consist, during the mating period, of short irregular flights in different directions, *frenchi* cannot be considered as being a migratory beetle although apparently enjoying a fairly wide range of distribution.

(2) Activities in Connection with Experimental Work.

It is regrettable to state that, owing to drought conditions having delayed planting up of our Meringa experiment plots, a decent strike was not secured until the beginning of February. Growth of the young shoots from deeply-planted sets was severely checked by the cyclone and flood rains, occurring on the 9th and 14th of February, respectively, which filled the planting furrows, nearly burying the tender shoots, and leaving the surface of the ground as uniformly level as a table. Further trouble was subsequently caused by stray horses getting into the selection on which these plots are situated—probably through portions of boundary fences that had been damaged by the cyclone—and eating down the young cane.

Despite such unfavourable conditions, however, two of the test plots have given encouraging results, viz.—that treated with "Chlorocide B"; and the one fumigated with paradichlor., applied by horse power. Both these experiments are well worth repeating next season. The results of other fumigants tested, such as "Chlorocide A," Carbosyl, calcium cyanide, &c., were rendered inconclusive owing to the various causes above mentioned.

REFERENCE TO PLATE.

Fig. 1.—Grub of *Melolontha melolontha* L. European Chafer, about 1½ times natural size.
Fig. 2.—Grub of *Lepidoderma albohirtum* Waterh. Queensland "Greyback" Cockchafer, natural size.
Fig. 3.—*Melolontha melolontha* L., natural size.
Fig. 4.—*Lepidoderma albohirtum*, natural size.
Fig. 5.—Elytron (wing case) of *Lepidiota rothei* Blkb., natural size.
Fig. 6.—Wing of same, natural size.
Fig. 7.—Elytron of *Lepidiota caudata* Blkb., natural size.
Fig. 8.—Elytron of *Lepidiota frenchi* Blkb., natural size.
Fig. 9.—Elytron of greyback cane beetle, natural size.
Fig. 10.—Wing of *Lepidiota caudata*, natural size.
Fig. 11.—Wing of greyback cane beetle, natural size.
Fig. 12.—Elytron of *Lepidiota consobrina* Gir., natural size.
Fig. 13.—Wing of same, natural size.
Fig. 14.—Wing of *Lepidiota frenchi* Blkb., natural size.
Fig. 15.—Elytron of *Anoplognathus boisduvali*, natural size.
Fig. 16.—Wing of *Anoplognathus boisduvali* Boisd., natural size.

CANE PESTS AND DISEASES.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report from the Assistant Pathologist, Mr. E. J. F. Wood, B.Sc., for July-August on the Ayr and Burdekin district.

BURDEKIN.

On the Burdekin, two diseases are startingly prevalent—Top Rot and Leaf Stripe. The former affects Clark's Seedling and Badila, mainly the latter variety, and the latter B. 208.

The disease known as "B. 208 disease" is in reality Leaf Stripe, and is a very serious matter. There is no denying that the days of this variety in this district are numbered, for on the majority of the farms the B. 208 is affected. Moreover,

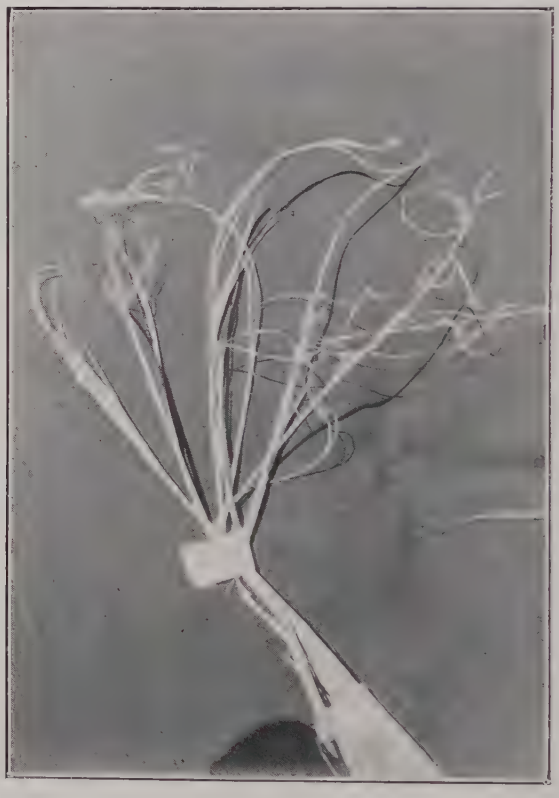


Photo.: E. J. Ferguson Wood

PLATE 57 (Fig. 1).—A LATE STAGE OF LEAF STRIPE.

Note the thin nature of the stick, the shredded leaves which are practically dead and shrivelled.

the disease is spreading into Goru, Badila, and other varieties, and unless something is done the position will become acute. All the advice that I can give to the farmers is to plough out the B. 208 in the district as soon as it is harvested, and to refrain from planting any of it. Such as is planted should be got rid of at the next crushing. With the presence in the district of such good canes as E.K. 28, Q. 813, Goru, and H.Q. 426, there is no excuse for the propagation of such a notoriously susceptible cane as B. 208. It will not come hardly on any farmer to discard this cane, which can only serve as a source of infection to the other and better canes, and may in time cause all the varieties in the district to be infected—a sad state of affairs.

There is hardly any need for me to give the symptoms of the trouble, as it is well known to most farmers. But, as there are some who may not know it, they are:—

An elongation of the stick affected. These long sticks can be identified easily; in fact, I have picked them out while riding along a road on a motor cycle at dusk. They will have stunted and dying tops, and the leaves will shred up into strands.

Examination of the leaf will show a series of whitish to yellowish stripes, which turn brown on the older leaves. These on the backs of the leaves show a white mould which consists of millions of minute spores or fruit, about 1/1,000 the size of a pin's head. It is an easy matter for these to be carried by a wind for considerable distances, and this is how the disease travels from an infected field. Another source

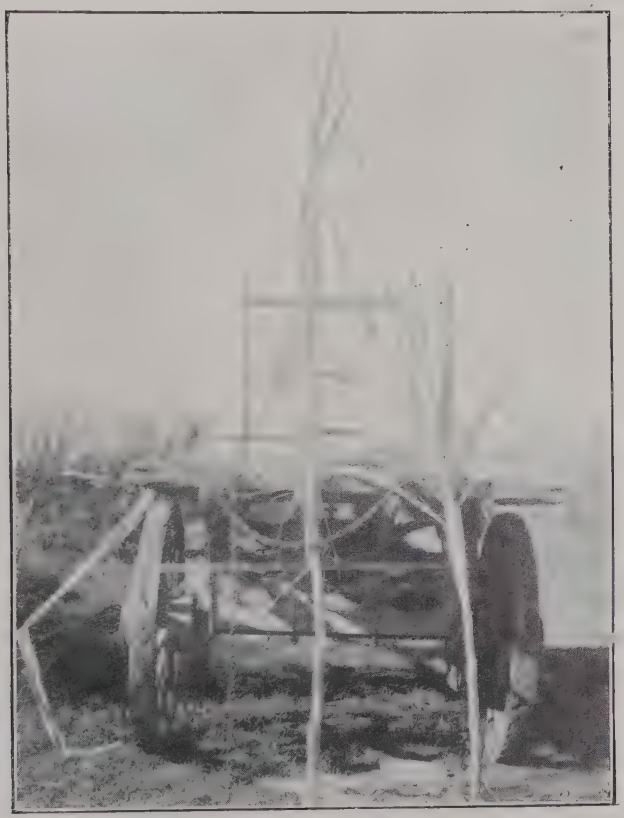


Photo.: E. J. Ferguson Wood.

Plate 58 (Fig. 2).—Leaf Striped and Healthy Cane.

The two sticks are the same age. The one on the left is diseased, and shows the extreme elongation, and cancered nature of the stem, the sparse leaves, which are beginning to shred. The one to the right is normal, with green healthy top, and full stick of normal length.

of infection is the planting of diseased cane, and to this is probably due the fact that B. 208 often strikes badly, for one would not expect badly diseased sticks to grow.

If you have the disease in other varieties, it will pay to dig out the diseased stools, and on no account to plant them.

With regard to Top Rot, this disease has been shown by Mr. Cottrell Dormer, of this Bureau, to be due to bacteria, and it is strongly suspected that bacterial entry is effected subsequent to a check in the growth of the cane. This would

account for the fact that on some farms and during some seasons the disease does not occur, and also for the fact that it occurs only in some sticks in a stool. The prevalence of the disease in Badila may be due to some peculiar formation of the leaves or some such varietal peculiarity.

The only advice that I can offer the farmer concerning this trouble is to try and arrange that the water is applied to the fields regularly, and to minimise all checks to the growth of the cane, as all the evidence that I have been able to obtain seems to point to the fact that the disease occurs in young, tender tops growing too weakly after a check due to drought. Some data has been collected, and the farmers are to be asked to supplement it as far as possible. It is hoped that they will realise the necessity and do so.

Mosaic disease is present on both sides of the Burdekin, to a limited extent it is true, but owing to the rapidity with which the disease spreads, every effort should

Photo.: E. J. Ferguson Wood.]

PLATE 59 (Fig. 3)—LEAF STRIPE IN POMPEY (7R. 428).

Note that the diseased cane marked "X" is much longer than the rest of the crop.

be made to check the trouble before it becomes epidemic. It is occurring in E.K. 1, Clark's Seedling (H.Q. 426), and in Badila and Tableland Badila in limited areas; but the worst infection and that most to be feared is the infection of B. 208. It was partly owing to Mosaic that this variety was discarded on the Herbert River. On many farms this disease was noticed in sorghum, Sudan grass, and Guinea grass, and also in corn. This tends to prove that it is dangerous to grow corn and sorghum, and that all headlands should be kept clean from the grasses which can carry infection from cane to cane. It is also noteworthy that these pests were worst on the farms that were showing Mosaic infection in the cane. This is no idle theory,

for it has been proved over and over again in Queensland, while Louisiana is an extreme example.

The farmers on the Burdekin have the idea that their district is almost free from disease, and tend to disregard Mosaic and Leaf Stripe, but I have not found the area nearly as free as some other districts.

In the Ayrdale and Maidavale areas Mosaic and Leaf Stripe are present, the latter being serious in some cases.

Pioneer, Brandon, and Colevale are very clean, but Top Rot and Leaf Stripe are present to some extent.

Jarvisfield and Macdesme have Top Rot on most of the farms, and it is doing considerable damage this year.

Rita Island and the Inkerman area are the most free of disease, and farmers can fairly safely get seed from these.

Airdmillan and Kalamia have Leaf Stripe in B. 208 and 7 R. 428 (Pompey).

Along the river on the Home Hill side Mosaic and Leaf Stripe and Top Rot are bad in patches, and the farmers are warned that B. 208 is a dangerous cane for both these diseases. It is also a hard cane to grow, and side-shoots badly; so that, despite its high density and good tonnage under favourable circumstances, the farmers would probably find, if they went into the matter, that it also costs more to grow than the other canes. Mosaic causes very great stunting in growth in this variety, and considerable losses may be expected if the disease spreads.

With regard to varieties, Badila is resistant to Mosaic and Leaf Stripe, E.K. 28 possesses tolerable resistance, and these can be grown on the rich river soils. For the forest soils, Q. 813 is strongly recommended as a resistant variety, and E.K. 28 is also a good cropping cane on poorer classes of soil. The varieties Korpi, Nanemo, and Oramboo are now in the district, and several good crops of the first mentioned are being grown. The resistance of this variety has still to be tested.

GIRU.

Many of the remarks that have been made with regard to the Burdekin apply here, especially with regard to B. 208. This cane is not, in my opinion, worth the trouble taken to grow it, and I feel sure that a crop of Clark's Seedling will be found to give better returns over a period. It is almost impossible to get a satisfactory ratoon crop of B. 208 on the Houghton, and it is the ratoon crop that pays. Even the plant crop, if it receives a check, side-shoots badly and spoils the crop. Moreover, it is almost impossible to grow a succession of crops without their becoming affected with disease. Leaf Stripe has been seen on several farms on the river, and in one case a bad infestation of this disease and Mosaic were seen on a field adjacent to one 16-acre block of B. 208. The chance of a good crop from this field is small indeed.

Mosaic is present in B. 208 on several farms along both sides of the river, and one field was 100 per cent. infected. There was a 40 per cent. strike, and only four sticks on a 4-acre block were found to be sound. The rest was stunted and the cane not worth harvesting. If farmers could see this field, it would be a warning to them against B. 208.

Top Rot occurs in Badila which had been under the floods at the beginning of the year and which followed the long dry spell. The disease is worst in the hollows where the waters lingered, and the occurrence fits in with the theory that it shows up in cane in which the growing point is tender after a long check.

Sclerotial disease is also present in B. 208, H.Q. 426, and Badila often in the same fields as the Top Rot, but can be distinguished by the fact that in this trouble the leaf sheaths are scarlet and tightly bound, the top being spindly and finally choking, giving an appearance very similar to Top Rot. It is caused by a fungus in the leaves and leaf sheaths. The leaves themselves show a pinkish tinge running about 3 in. up from the sheath, while Top Rot is distinguished in the corresponding stages by blood-red streaks in the leaves and of considerable length.

The farmers of this area are warned against the practice of getting plants from the Ingham line, owing to the risk of bringing Gumming disease from there, for it is not yet prevalent at Giru. This is important, and the idea of getting varieties from trucks in the mill yard should also be abandoned for this reason.

Grubs are doing considerable damage on a few farms on the Houghton, and an occurrence of wireworm has been reported to me.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has made available the following report of Mr. E. W. Mungomery, the Southern Assistant Entomologist, from 14th July to 15th August.

BUNDABERG.

Insect ravages in the Bundaberg district have been comparatively small during the past few months, so that no artificial control measures have had to be resorted to. This freedom from pests at the present time is probably due to two causes—(1) Hibernation, and (2) the relative scarcity of the major cane pests in the Bundaberg district.

Hibernation is the term applied to the dormant condition of certain insects or animals during the cold weather, and this overwintering may take place in either the egg, larval, pupal, or imaginal stages, accordng to the insect under consideration. Some insects hibernate on account of the scarcity of their particular food plant, but on the whole, those cane insects which do hibernate, do so as a protection against the extreme cold, and not through any scarcity of their food. A well-known example is the case of *L. frenchi*, whose grubs hibernate in the second stage at a depth of about a foot or more in the soil. At the end of this quiescent period they moult and change into the third stage, resuming their destructive activities in the months of September and October. Farmers frequently plant their cane in August, thinking that by the apparent absence of grubs they have none to worry them, and it comes as a surprise to them to see their young cane yellowing in the summer months, and to find that grubs really are present, in which case the true cause is explained by the above facts.

Although we have in Bundaberg most of the serious cane pests which give trouble in the neighbouring cane-producing districts, yet it has frequently been a subject of comment that this place at present enjoys comparative freedom from these pests. This is no doubt due in a large measure to the scattered nature of the district, farms being in most cases situated close to large stretches of scrub and forest, which provide shelter and nesting grounds for insectivorous birds. Chief amongst these are the ibis, crow, pee-wit, magpie, butcher bird, and the sea-gull, the latter being confined mainly to the coastal section, and they are all useful in destroying soil-frequenting insects, which are the chief source of annoyance to the cane farmer.

Pests Checked—The Farmer's Feathered Friends.

Through the activities of birds and parasites chiefly, and in a lesser degree due to outbreaks of fungus and bacterial diseases, pests have not been able to increase in sufficient numbers to regain the ascendency and to occasion serious, or in certain cases, even noticeable losses. In expressing this the writer has in mind the cane grub *Pseudholophylla furfuracea* Burm. In past years this grub was reported to have caused considerable damage in parts of the Woongarra district, but unfortunately it now remains in minor importance. Contrast this with the position of the same grub in the Isis district, and it will be seen that a totally different state of affairs prevails there, where it is a serious limiting factor in cane production on many farms. The Isis district is much more hilly than the Woongarra, but otherwise conditions seem to be identical, such as the same red volcanic soils, and the bird and insect fauna would also appear to be similar. The question then arises why should the Woongarra district enjoy apparent immunity from *furfuracea* grubs whilst the Isis district is in parts heavily infested; and this becomes one of the problems that the entomological worker is called on to elucidate. It is not a straight-forward matter which can be answered at once, but it will probably involve years of work in studying the economic conditions governing the increase of our effective parasites. All this and probably more must be attempted before any definite and clear solution can be given which will satisfactorily explain the state of affairs existing at the present. Then only may we be in a position to recommend some measures that would preclude the necessity for fumigation, which involves a considerable outlay of money in providing injectors, fumigants, and labour.

Pests and Their Natural Enemies—Need for Discrimination.

Going back to our comparison between conditions in the Isis and Woongarra districts, we find that in the former payment is made for the collection of grubs, and for this purpose children or boys are employed to follow behind the ploughs, collecting them as they are exposed by each furrow. This practice evidently is not considered necessary on the Woongarra farms, and the benefit, if any, should be with the Isis farmers, but this certainly does not appear the case; therefore weak points in the system must be looked for and rectified. Doubtless there are several

other contributory causes, but the following appears to be very evident, and to be a factor of great importance in this connection—namely, that little discrimination is made between parasites, predators, and the actual grubs themselves. All go into the collecting tin, to be paid for at so much per pint or quart, and as they all help to fill up the tin, beneficial insects as well as harmful ones are destroyed in this way. This has a reflex action in that these insects would in the ordinary course of events attain the adult stage and their progeny attack more grubs in the field, and so establish a natural biological control. By destroying them the activities of each species are curtailed. Digger wasp (Scoliid), Robber fly (Asilid), Carab, and predaceous Elaterid larvæ all come under the category of useful insects and should be protected.

Useful Insects—Need for Recognition.

When the writer inspected the Isis cane fields for the first time he was impressed by the scarcity of parasites, &c., and in a report to the Director stated, "Too much cannot be expected from natural parasites. . . . These are remarkably few in numerical strength at present." At that time the position, as far as parasitic aid was concerned, seemed rather forlorn, but he pointed out to many of the farmers several of the useful insects, which they had previously regarded as pests. These some of the farmers have guarded very religiously, and there is a noticeable increase on many of their holdings. It was particularly encouraging to notice one field which last year carried a heavy infestation of grubs was this season very free from grubs, and Asilid larvæ, or "concertina" grubs as one farmer aptly designated them, were present in hundreds. Of course to arrive at hasty conclusions does not provide a very sound basis on which to work, but knowing the voracious habits of these long white maggots it is only reasonable to assume that they in no small measure accounted for several of the cane grubs, and helped to clean up the field.

This is only one case cited out of several, and the presence of numbers of predaceous wireworms in the Bundaberg cane lands, with their freedom from grubs, would help to establish their claim as valuable friends of the farmer.

This advice then, is given with the intention of impressing on farmers, who in their turn should instruct boys collecting grubs, the necessity for recognising their insect friends, and allowing them to remain undisturbed in the soil. Honorary receivers, by refusing to accept quantities of grubs in which were mixed beneficial insects, could do much in tightening up the apparent looseness that now exists as far as friendly insects are concerned, and it behoves everybody to co-operate in every possible way to bring about a more effective natural control.

FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports (25*th July*, 1927) :—

Bucca.

It is some years since the tonnage per acre equalled the present one. This is due to several important factors—namely, good rains early in the year, fertilizing, improved cultivation, and draining. Growers deserve their measure of success, for they are certainly a progressive group. There is still a fair amount of draining required in this area, as well as other districts, so that the following remarks on this phase of farm engineering may be of use.

The Objects of Draining.—The principal objects of draining are: To carry off stagnant water, to prevent the rise of springs, to allow the escape of excessive falls of rain, to render the land sufficiently dry for cultivation, and, at the same time, regulate the supply of moisture to the growing plants.

Thorough drainage not only lets surplus water out of the soil, it also greatly mitigates the effect of dry weather; when land is soaked with rain and dried by evaporation the soil becomes extremely hard.

Digging the Ditch.—The digging should commence at the lower end and proceed uphill, so that the land to be dug will be dry or practically so. It is important that the bottom of the drains should be properly graduated. A simple method of testing the fall is to pour water into the drain and note any interruptions in the flow. When the drains are deep and the sides likely to fall in the earth should be taken out of the whole length of the drain within a foot or two of the intended depth, and then the bottom spit can be taken out and the laying of the pipes and the bottoming all completed in one day.

Size of Drain Pipes.—As regards the size of drain pipes it is important that the capacity should be in proportion to the amount of water they have to carry

away. When drains are long, pipes of different diameter should be used, the largest size being at the point of discharge. As proof of this it can be pointed out that if a drain is 500 yards long, and the distance between drains 8 yards, the pipe at the mouth must be able to discharge all the water drained from the 4,000 square yards of land, while at the middle of the drain the pipe will only have to take the water from 2,000 yards. The following conditions influence the size of drains:—

Length of drain; depth of drain; velocity of fall; distance between drains; nature of soil (porosity, &c.); daily rainfall; spring water; and evaporation and vegetable requirements.

Laying the Pipes.—The laying of pipes, if not done by the farmer himself, should be entrusted to a careful workman paid on day wages, as more attention is paid to the performance of the task than if done by piecework.

The pipe layer must be careful to see that the bottoms of the drains are of stipulated depth, and properly graduated before he lays a single pipe, and when finally placing the pipes should pack in with "blinding" before the drain is hurriedly filled in. The pipes should be laid as close and tight as possible, and the clay carefully packed around them to keep fine particles of earth from washing in. There is no danger that the water will not find its way in. A plan should be kept of the system.

The subject of drainage, a very large one, will not be further touched upon in this report, but for further information growers are recommended to communicate with the Director of the Bureau. Drainage is so important to the sugar grower that, where necessary, it should not be neglected.

In the Bucca district, growers are obtaining good results from complete manures containing a predominance of potash. It is recommended that experiments be tried on lines laid down in last month's report.

Varieties doing well are M. 1900 Seedling, Q. 813, H.Q. 285, and D. 1135.

Goodwood.

This red volcanic soil area is yielding a good crop this season. Varieties making good growth are E.K. 1, E.K. 28, H.Q. 285, M. 1900 Seedling, D. 1135, and Uba. Growers are recommended to practise lengthy, systematic fallows of the land, as this is the best method of combating root rot disease, which is prevalent in this area.

Gin Gin.

It is said that fortune favours the brave, and it must be said that the growers in this area, having shown great courage and resource in meeting their difficulties, have been rewarded with an excellent crop. The variety probably looking the best is the M.1900 Seedling. H.Q. 285 is showing good results; also D. 1135 and Q.813. There is a certain amount of Mosaic to be combated, but this only presents a real problem on the Burnett River. It will mean disaster to the growers in this latter locality if they neglect to be careful in plant selection, but with reasonable care in this respect the disease is readily enough controlled.

Growers are advised to plant buffer strips of the immune variety Uba round their headlands, and if they cannot mill this cane it always makes excellent forage. The reason for making this suggestion is that the other canes would not be so closely in contact with disease-carrying grasses.

Maroondan.

The cane in this district looks well also. This black soil is very productive, provided it gets fair rains, and these, fortunately, have fallen this year. Provided no late frosts occur, the growers are assured of good crops. Cane varieties doing well are H.Q. 285, Q. 813, and M. 1900 Seedling. Disease does not present a problem here, but, nevertheless, the growers are reminded that, in common with other areas, the principal cane maladies are present, furnishing evidence for incessant care in plant selection.

Bingera.

Cane varieties doing well here are N.G. 16, Q. 813, Q. 855, Q. 812 A, Black Innis, and H.Q. 285. The first named is giving excellent results as a standover, particularly that which has been fertilized with molasses. There is no doubt that this product greatly improves the texture of some soils, as marked results from its use have been obtained in Queensland. Q. 812 A is an excellent cane, very like Q. 813, excepting that it is a slightly heavier stooler, with a greener foliage and leaf sheath. It is a cane worth carefully watching.

The Southern Field Assistant, Mr. J. C. Murray, reports (17-8-27) :—

During the period 14th July to 13th August work was carried out in the Childers, Maryorough, and Pialba districts. In addition to the usual duties of the Field Officer, work in relation to Fiji disease under the Diseases in Plants Acts was performed. Growers are requested to co-operate with the Bureau staff in eradicating this insidious cane malady, and not compel drastic action by disregarding the instructions given in relation to control.

One very important matter that farmers must carry out is the eradication and destruction of diseased stools as soon as they are found, unless, for the purpose of demonstration and experiment, the pathological staff have given instructions otherwise.

THE ISIS.

At Childers work was proceeding smoothly, although intermittent showers were causing slight checks in cutting.

Varieties.

The principal canes growing are M. 1900 Seedling, D. 1135, N.G. 16, M. 55, Black Innis, and H.Q. 285. Of the newer varieties H. 109 is the best. Badila is also grown, but not extensively.

As there is an inclination on the part of some growers to make their staple varieties M. 1900 and Badila, a discussion as to the merits and demerits of these canes would not be amiss.

N.G. 15 (Badila) has been tried many times in Southern Queensland and on the whole has been found unsuccessful; being a slow grower, it has not proved satisfactory in some instances, though in other cases it has done well. It has been found susceptible to Fiji disease and gum.

Badila, however, is a very fine cane, yielding a big crop in the average growing period, with a high percentage of c.c.s.

M. 1900 Seedling is a cane that, under favourable conditions, will produce a good annual crop of high sugar content. As it is a late-maturing cane, it is absolutely essential to grow a quantity of some early-maturing variety to commence cutting upon. M. 1900 Seedling is a variety susceptible to Root Rot disease, Mosaic disease, Fiji, and Gumming disease.

Clean Fields—Farmers Commended.

There are several matters upon which the Isis growers can be congratulated, and one particularly, and that is the clean state of the farms. This is due to plenty of surface cultivation. Weeds are a curse. They injure the plant and reduce the yield in many ways. They crowd and shade the young canes, keeping away the sunshine and making them spindly. They steal food from the plants, disputing with the young crop Nature's storehouse of soil food. Weeds rob the crop of water as well as of food. They use as much—sometimes more—in proportion to their size as cultivated plants. It is in this way they inflict the greatest damage on crops.

Cultivation is the great weed-killing factor—at all events for crops that permit of interspace working, like cane. It is, however, important to know at what stage of a weed's growth it is easiest killed. The vulnerable stages of weed growth are just at sprouting and flowering time. Pasture weeds (perennial) are best killed when in flower, but the sprouting stage is the best time to tackle weeds on cultivated land. Weeds are mostly in the top inch of soil, and very little disturbing will expose the sprouting seeds and young weeds to the hot sun, when they will die. A good farmer hates weeds, but weeds, like the poor, are always with us, and we are liable to grow indifferent to both.

PIALBA.

A short time was spent in this district. Pialba is one of the healthiest cane districts in Queensland. Farmers should not, however, relax on this account, but be active with regard to plant selection and knowledge of disease, until they are 100 per cent. efficient in this respect.

Cane varieties observed making good growth are Q. 813, H.Q. 285, H. 109, H. 227, H.Q. 77, Black Innis, D. 1135, and Malagache.

Q. 813 is actually the best of these. H.Q. 77 is a cane the writer would advise the farmers to try more than they are doing. It is a heavy cane of good sugar content, though not a heavy stooler.

MARYBOROUGH.

Good crops are being cut here, although at present, in one or two varieties, particularly D. 1135, density is not high. However, taking everything into consideration, the sugar industry is gradually getting on a better footing, especially with the advent of motor lorries for haulage. The farming standard is improving, and better varieties are being grown. Farmers are recommended to plant H.Q. 285 and Q. 813 as much as possible.

There is no need to enlarge on what will happen to the crops if Fiji disease is ignored. The growers know the position, or if any are in doubt, let them visit an infected farm and note the injury.

Farmers are advised to study the art of farm road-making, as good farm roads minimise expense of transport, increase farm efficiency generally, and enhance the value of the property.

The Central Field Officer, Mr. E. H. Osborn, reports for July, 1927:—

AYR (KALAMIA AND PIONEER).

This area was inspected about the middle of July and looked remarkably well with beautifully green grass everywhere, creeks running and lagoons and waterholes carrying a splendid supply of water.

This is certainly out of the common for such a time of the year, and very old growers say that they cannot remember such ideal conditions for very many years.

Up to date the splendid total of 43.21 in. of rain has fallen—i.e., January, 16.04; February, 14.30; March, 3.45; April, 0.10; May, nil; June, 5.19; July, 4.13; total, 43.21 in., which is just about the average yearly rainfall for the Burdekin for a number of years.

It is to be hoped that this is only the first of many such seasons that will enable the Burdekin to again grow the phenomenal crops that were once so characteristic of the district.

As regards the present season's crops, they are certainly very good and show improvement since my visit here some three months ago, but one would have expected to see the cane more forward under such ideal conditions. It was pointed out, however, in my April report, that the very heavy falls in the early part of the year culminating in floods came along at a time when the cane was making splendid growth and then ceased abruptly, being followed by two practically dry months, resulting in large areas of the ground becoming absolutely caked, thus giving a decided check to the growing crops. Luckily, however, the good rains of June and July came along, saving fresh pumping operations and giving the crops a fresh lease of life.

As regards the young plant cane, in most places there has been a very good strike, the exception seemingly being in the lower lying portions of which Kalamia has probably a larger percentage than Pioneer), more especially those that were in an extra good state of tilth.

For instance, one very thorough Jarvisfield grower gave his ground two ploughings before the very heavy rain, and as soon as possible after the downpour ploughed in a very heavy crop of grass, followed up by another two ploughings before planting. Good plants were used, but the strike was a very poor one, large quantities of "misses" having to go in.

In an adjoining block, which was only worked after the rain and which was in a poor state of cultivation, he, however, obtained an excellent strike. It seems as if heavy rain on extra well worked soil is calculated to cause the soil to set too much. Present prospects for next year, however, indicate such a large crop that the local mills will be taxed to their utmost to handle same.

When the district was visited both mills were in full operation and doing very satisfactory work, delayed only by wet weather on a couple of occasions. Considering the rain that had fallen the density figures were exceedingly good, B. 208, H.Q. 426, and N.G. 15 being the best. E.K. 28 was also giving good returns, considering that it does its best in September and October generally; Q. 813 was also giving good returns, one sample going 16.2 being noted, whilst 99 tons of it gave an average of 15 c.c.s., with the period of supply ranging from 4th to 23rd July.

Varieties.

N.G. 15 (Badila), H.Q. 426 (Clark's Seedling), B. 208, M. 1900, E.K. 28, Q. 813, N.G. 25 (Goru), Hybrid No. 1, and Q. 903 are amongst the canes grown in the area, and each yield good returns upon suitable soils.

Badila, upon suitable soil, is one of the very best, but unfortunately in this area suffers from Top Rot in several places, otherwise it is an ideal cane, being easily the best variety to stand over.

Clark's Seedling is also a wonderfully sweet cane, very suitable for early cutting, but on many farms carries an undue proportion of dead stalks, apparently suffering from a species of Wilt or Rot.

B. 208 is a wonderfully sweet cane, too, but unfortunately is too liable to Leaf Stripe; in fact, there is so much of the disease in this variety that there is a probability of its going out of cultivation.

E.K. 28 has been planted out very extensively this year, and there is also a large acreage of it to be crushed this season. Some really splendid crops of it were noticed, and the density returns of same will be very interesting.

Q. 813 is a cane that is well worth growers' attention for poor to medium ground, for it is a splendid striker, quick grower, and hangs on to its density on suitable land practically all the season. It is also about the most free from disease of any cane. Its faults are that it is a shallow rooter, and in light sandy or grubby areas will fall down very easily.

M. 1900, for late cutting, is also a good cane.

Green Manuring.

Examples of typical Burdekin soils indicate very clearly that the above is to be highly recommended. Corn, on account of its relation to Mosaic, should not be grown anywhere near the cane paddock, therefore cowpea should be used. As mentioned in an earlier report, the Kalamia mill management have had very good results from same.

Liming, except in the very heavy, stiff soils, does not seem necessary. A top dressing of sulphate of ammonia or nitrate of soda upon ratoons in a year like the present will, however, be found to be very payable.

Diseases.

Leaf Stripe, Top Rot, and a little Mosaic are the chief diseases in this area. As for the first it is chiefly confined to B. 208, and shows up far more in the ratoons than in the plant cane. This year's crop contains a fair proportion of the above cane, and in most farms where the cane is growing, from a few to a large number of diseased stools can be seen. Control measures are digging out and burning affected stools, ploughing out and planting with a resistant variety, otherwise B. 208, as a cane variety, is liable to go out. Some years ago a large quantity of this variety was grown upon the Herbert River, but Leaf Stripe and Mosaic became so bad that it finally went out of cultivation.

Top Rot is mainly confined to Badila, although a certain proportion was noticed in B. 208 and M. 1900 in the early part of the season.

Mosaic in Clark's Seedling was noted at Airedale and Jarvisfield. In every case the disease was pointed out to the farmers, and they promised to eradicate the stools.

Red Rot in Clark's Seedling was also seen upon a Macdesme farm.

Grubs and White Ants seem to be the chief cane pests upon the Ayr side of the river, but luckily are confined to isolated areas.

The Northern Field Assistant, Mr. A. P. Gibson, reports for the month of July.

CAIRNS.

During July not much rain fell; the weather was warm at the beginning but decidedly cold at the end of the month.

The total rainfall for the year up to the end of July was 83.03 in.

The crop had improved little in growth since my last inspection—generally, it was very backward, rather low shaped, and below early estimates. Climatic conditions largely influence the production of cane and its sugar content. The crop's backward nature may be attributed to the February disaster, which occasioned severe damage to the root and top system. Grubs in no small degree had seriously retarded the growth in many canefields. It is earnestly hoped that the plant cane will weigh better than the ratoon so far harvested.

Varieties.

The principal variety grown at Freshwater is N.G. 15 (Badila); much of this kind was seriously damaged by water, the non-functioning of the top causing heavy stem shooting. Hambledon, Waree, and Sawmill Pocket grow principally D. 1135, H.Q. 426, N.G. 15 (Badila), 7 R. 428 (Pompey), and a very little H.Q. 458; this variety permits heavy weed growth, and is not desired because of the harbourage offered to pests and fungi, and to the spreading of weeds.

Harvesting and Grinding.

The weather has been ideal for this work. The covered areas are being bared with amazing speed due to crop lightness. The quality of the cane at the beginning was lower than usual. A common complaint is light cane trucks. The company make allowances for damaged flood cane, but will not tolerate trashy cane; that containing over much leaf is promptly returned to the harvesters for cleaning. Patches of cane were accidentally fired by passing locomotives. At the present moment it is thought the early crop estimate will not be reached.

Cultivation.

This part of the business is worthy of more consideration. Some fields have been ratooned when they should have been ploughed out. Ratooning should be performed as soon after trash burning as practicable; if delayed, serious consequences may follow. Harvested fields are sometimes cross-harrowed by discs prior to ratooning; this is to be highly recommended, especially in poorly harvested fields. Tractors big and small are going their hardest, and are indispensable in our days for the general advancement of all classes of field work. Recently harvested fields are being prepared for immediate planting. This is the time when surface soil tilling of interspaces is of much value; it controls weeds, conserves moisture, promotes growth, and in every way benefits the present and subsequent crops. Neglected headlands are a danger to clean fields. Home-made weeders were doing good work. It should be understood that as much as possible of the plant foods of a crop raised in a field should be returned to it, if not the soil from whence it was taken is so much the poorer.

Planting.

Planting is in progress. Some fields have been well tilled, others have not. The thorough preparation of the soil, coupled with judicious plant selection, has a powerful influence on subsequent crops; the intelligent farmer understands the great value of such a wise procedure. Edmonton forest land is costing some £40 per acre to clear and plant. Old orchards at Freshwater are gradually being cleaned up and planted to cane. Too much soil over plants is a common error; following lighter implements have the great tendency of adding still more covering.

Manure.

The soil must be moist enough to admit of manure being readily dissolved and conveyed to the roots. Different fertilizers at different rates are being added to the plant and ratoons. Offal from nearby slaughter-houses is being spread over some of the poorer fields. Molasses should be a good soil improver. An adjacent Hambledon mill red soil farm had received some 25 tons filter press cake per acre and much mill refuse water. Over 40 tons of N.G. 15 per acre was being harvested. The foliage coloration was fine.

Pests.

Grubs and Big Moth Borer are killing more shoots than usual. Midrib Borer frequently occasions dead stripes in leaves. Army Worms, Leaf Hoppers, and Linear Bugs plentifully found.

Diseases.

To prevent the ever spreading of these we must endeavour to eradicate the source of infection. If our farmers would co-operate more the annual losses would be lessened. The good achieved by some is being undone by others. Leaf Scald very prevalent in Badila in parts. Leaf Stripe was also seen on three farms at Sawmill Pocket. It is gratifying to note the energy displayed by the farmers that have this. The varieties affected are Pompey and D. 1135. Top Rot less severe now. Spindle Top and much leaf rust noted.

MULGRAVE.

Harvesting and grinding is proceeding smoothly. The big factory continues to do splendid work, and it has made satisfactory progress with its new crop. To the present moment little time had been lost. Some 30,000 tons has been milled. The

mill average sugar content is now over 13.5 per cent. and steadily rising. More double-tiered cane than usual is coming forward for treatment. Some short, heavily soiled, poor-looking cane is being harvested on the severely inundated river flats. The under stem shoots on the fallen canes had perished; the upper ones had grown vigorously and are now showing some foot of cane; these shoots are existing on the stems and are considerably reducing its sugar content.

Weevil and the big Moth Borers were very active in such places. The crop appearance had improved much during the last nine weeks. Wintry conditions should have a beneficial effect so far as its quality is concerned. Brown patches among the green indicated the grubby spots. The early crop forecast of about 160,000 tons still is unchanged.

Gumming disease still at Aloomba. The writer had little difficulty in finding this. Gum oozed freely from the cut cane ends of the variety H. 109 growing adjacent to the southern banks of the Mulgrave River on two farms. Mosaic disease was abundantly noted in the same variety.

Filter Press Cane.

The value of this was clearly indicated on a Highleigh farm. About a chain of poor soil extending right along a big block had received a good dressing; the cane had not arrowed and was outstanding in colour and growth.

A good preparatory tractor-drawn implement (Australian made) was seen at work on a Highleigh farm (known as "The One Way Disc"). It contains eight discs, and when operating divide finely the old stubble and just goes deep enough to plough same out. The resulting work is improved by passing a disc harrow over it.

LITTLE MULGRAVE.

The picturesque fertile Upper Little Mulgrave River Valley has produced another good crop in spite of the severe flooding in parts. The coloration of the cane was especially green where it had been submerged, thus proving the immense value of water-borne soil transported at time of flooding. Leaf Scald and Brown Rot noted. Stools having the latter complaint simply die right out, and the ground end of stems, if opened, will be found to be of a brown pithy mass. The writer thinks it is a fungus passed over from wood to cane; so far as is known, found only in new scrub lands. Floods do good as well as harm. Last year the crop here was greatly damaged by rats. So far little injury has been occasioned by them; it would therefore appear that the flood had swept the pest away. Last year this area yielded some 15,000 tons; 1927 it is forecasted to produce about 13,000 tons.

BABINDA.

Rainfall to 23rd July over 5 in.; for year to same date, 139 in. A sunny patch followed the long dreary wet; this was generally welcomed. Overmuch rain at the beginning was prejudicial to the harvesting. The factory is now grinding continuously and well. The ever-rising mill average c.c.s. has reached 13.5 per cent. Forty thousand tons of cane had passed between the rollers, and another 150,000 remained to be milled. Approximately 11 per cent. of the total cane harvested is being burnt by permission prior to harvesting.

The Crop.

The crop is again satisfactory. Shabby patches were noted among the good. The cane possessed a healthy colour, but did not appear to be making its usual headway; the shortened period of cultivation obviously had an ill effect on its season growth. Grubs ravage decidedly less this year. The fields are cutting out quite up to early expectations. Lighter cane trucks may be attributed to crooked nature of cane rather than light cane.

It is customary to burn all trash as soon after harvesting as possible. Prevailing wet conditions have been responsible for most unsatisfactory burns. This rubbish is a breeding ground for some of our dreaded pests and hinders the necessary interspace cultivation, therefore it is highly recommended, where possible, to horse-rake this into lines and burn when favourable. The rotary cultivator is popular and doing good work, but is considered costly.

Early plant cane had germinated favourably and is making good growth, but the ground surface appeared hard in places. Farmers are preparing more land for planting; others are planting. It is not advisable to plant the following:—

(1) Severe grub-eaten cane; this is lacking in vitality.

(2) Borer-tunnelled or badly rat-eaten cane. The former may spread the pest to clean fields; the injury caused by the latter serves as an easy inlet for either pests of fungi and frequently is responsible for unsightly misses.

Old stumpy land is being cleared with the help of explosives, costing all the way from £7 to £15 per acre.

Birds.

Encourage bird life at all times on the farm; they are of untold value in keeping down pests. The good old Ibis, especially the black variety, is abundantly seen at present on the farms; the white kind is more shy and prefers sporting round the swamps.

Pests and Diseases.

Grubs and Weevil Borer are damaging cane severely in parts. Cocoons of the tachinid fly, its valued parasite, and the fly itself were found at Bucklands and nearby Babinda farms. The recommendation to leave small patches of cane to standover was urged.

Leaf Scald severe in the Goru family of cane, H.Q. 426, and to a lesser extent in Badila. Spindle Top responsible for great all-round losses in Badila No. 1 Division.

Wireless Plants.

Since the recent blow many wireless plants have been installed in the various sugar areas.

THE COTTON INDUSTRY—TAKING STOCK.

In view of the approach of the coming cotton planting season the Acting Premier and Minister for Agriculture and Stock, Mr. Forgan Smith, informed the Press recently that it was desirable to take stock of the present situation in the light of last year's experience. The prospects ahead of the cotton industry were at the present time bright, and such as to afford encouragement to cotton growers to increase their area. In 1926, during the planting season, there was a slump in the world values of cotton, the price of American middling on the Liverpool market dropping from 10d. to 6¾d. per lb. Further, at that time the question of a bounty on cotton was uncertain, and no definite understanding had been arrived at with regard to the ginning of cotton and the sale of seed. As a result uncertainty existed among all interested in the industry, and the consequence was a small planting. Some growers went in for dairying and others planted broom millet.

Since then the whole situation has changed for the better, The Queensland Cotton Board, operating under marketing organisation legislation initiated by the Government, has been successful in improving marketing conditions generally. Acting on behalf of growers satisfactory arrangements have been made for the ginning of cotton and for the sale of seed, and these have resulted in many economies. Owing to the establishment of cotton manufacturing industries in Australia the whole of the 1927 cotton crop has been marketed within the Commonwealth at prices based on import parity; this means a substantial improvement in the price which is being realised by growers on what they would have received if it had been necessary to export the cotton and accept world parity. The Commonwealth bounty of 1½d. per lb. of seed cotton has been definitely fixed for a term of years ahead.

The 1927 cotton crop has, generally speaking, been of high quality, the bulk of it having been classified in the long staple grades for which there is the best demand at the most favourable prices. If this quality is maintaned there is every prospect of marketing in Australia in 1928 at an Australian price a crop of double the quantity produced in 1927. The world price of cotton has made a recovery and now stands at a higher level than was in prospect during the last planting season.

Advice has been received from the Cotton Board that the demand for seed for the coming planting is very satisfactory. Large areas of land throughout Queensland are favourable for the production of cotton, and those with the knowledge of the industry considered that the time is now opportune for growers located in areas suitable to the production of the crop to immediately and seriously consider the question of taking up such production. It is desirable to emphasise, however, that for the successful production of cotton, the land should be thoroughly prepared and well looked after during growing operations. Haphazard and inefficient methods of cultivation are bound to bring about disappointing results. The Department's officers are available at all times to advise intending growers, and in the meantime it is hoped that every opportunity will be taken by farmers to avail themselves of the favourable prospects at present existing in this promising industry.

SOME NOTES ON CUTWORMS IN COTTON.

By E. BALLARD, B.A., F.E.S. (late Commonwealth Cotton Entomologist).

The opening of the cotton season 1926-27 was marked by widespread attacks of cutworms, *Euxoa radians* Guer., which damaged not only cotton but other crops as well, and considerable loss was occasioned. Many cotton farmers lost their entire planting, and this loss was aggravated by the fact that no further planting rain fell until the middle of December, a date which, over most of the cotton-growing areas, is too late for bringing a full crop to maturity.

So far as the limited staff allowed, demonstrations were given to farmers in the various cotton districts of the use of the Paris green and bran baits for poisoning the cutworms, and before the attack developed notices appeared in the Press warning cotton-growers of the possibility of cutworms appearing.

A very severe infestation took place at the Cotton Research Station at Biloela, in the Callide Valley, and in consequence it was possible to make some observations on the nature of the attack which seemed of sufficient general interest to farmers to warrant their publication as, so far as the writer has been able to discover, they have not before appeared in print.

Observations of cutworm infestation have not been carried on for sufficiently long a time for one to be able to say whether these pests are to be expected every spring, as is the case with the corn earworm, or whether they will only occur in certain years. For the present it would be safer for all cotton farmers to regard cutworms as annually occurring enemies and to take the necessary precautions to render their assaults harmless.

The history of the cutworm invasion at the Cotton Research Station is as follows:—

Cotton was sown in the last week of September and the first week of October and damage to the cotyledons or first leaves was first noticed on 13th October. This damage was in some places very severe, the leaves being entirely devoured. Five acres of cotton was entirely destroyed or so badly damaged that the surviving plants were ploughed out.

Baiting was resorted to, and dusting with calcium arsenate, and by 21st October the attack had died down and was over by 25th October. There was a recrudescence in November which was immediately checked by means of the Paris green bait, and since then there has been no further trouble.

The peculiar feature of this outbreak and where it differed from others which have been investigated was that the worst damage was done by very young cutworms, for which the bait appeared to be too tough. These young caterpillars, instead of being one or two to a plant as is usual with the older ones, fed in masses and in a single night played great havoc, some feeding on the cotyledons almost as soon as they unfolded above ground.

Generally the most destruction is done by cutworms which are half grown and it appears to be rare for smaller ones to be found feeding on the cotton seedlings.

So long as cutworms were available in sufficient quantities, constant observations were carried on both in the field and in the laboratory, and

as a result of these certain conclusions were arrived at which are as follows:—

Moths first emerge during September and before eggs are laid certain conditions have to be fulfilled. These appear to be the presence of cover such as that provided by low spreading plants like bull head (*Tribulis terrestris*) or pigweed (*Portulacca*).

The soil in which eggs are to be laid must be moist but not wet, and the bull head or pigweed must be in such a state of growth that it acts as a mulch, keeping the soil moist during the hatching period.

Egg laying invariably took place after one of the light showers experienced in November, and always and only in places where the conditions of moisture obtained which have been outlined above. Bull head which has become straggly and ceased to provide shelter was never chosen, while thick matted bull head nearly always yielded a find of eggs or young caterpillars.

So long as there is a plentiful supply of bull head the younger stages of the cutworm do not scatter but remain feeding on the leaves of the bull head. It appears to be only the half-grown caterpillars which wander from the place where they hatched in ever-widening circles.

At Biloela when the cutworms first appeared there was very little bull head or pigweed growing owing to the prolonged dry weather, and this probably accounts for the fact that the young cutworms attacked the cotton in the way they did.

Another very important conclusion which the evidence seemed to warrant was that eggs are never laid on or under the cotton plant, and that in a clean field all damage done by cutworms would be from invasions from headlands or from neighbouring unweeded paddocks.

If forced to do so by special and peculiar circumstances, a moth will lay in situations other than those described, but this is rare and normally eggs are laid in moist soil and under cover.

An interesting example of a forced laying was found where a moth had laid her eggs in the web of a Red-back spider (*Latrodectus hasseltii* Thor.).

Cutworm eggs will not survive the action of direct sunlight and layings made under bull head, when exposed to the sun, shrivelled up.

Bull head appears to be the favourite plant under which to lay, and the eggs are often lightly covered with soil and are sometimes difficult to find. Pigweed is also used but not so commonly as bull head.

Eggs have been found under *Euphorbia drummondi*, but the cutworms would not eat it.

The soil conditions under this plant were ideal from a cutworm's point of view, and this probably enticed the moth to lay there. It is very unusual to find dead moths lying under bull head amongst the eggs. Of the numerous plants examined only these had eggs laid under them.

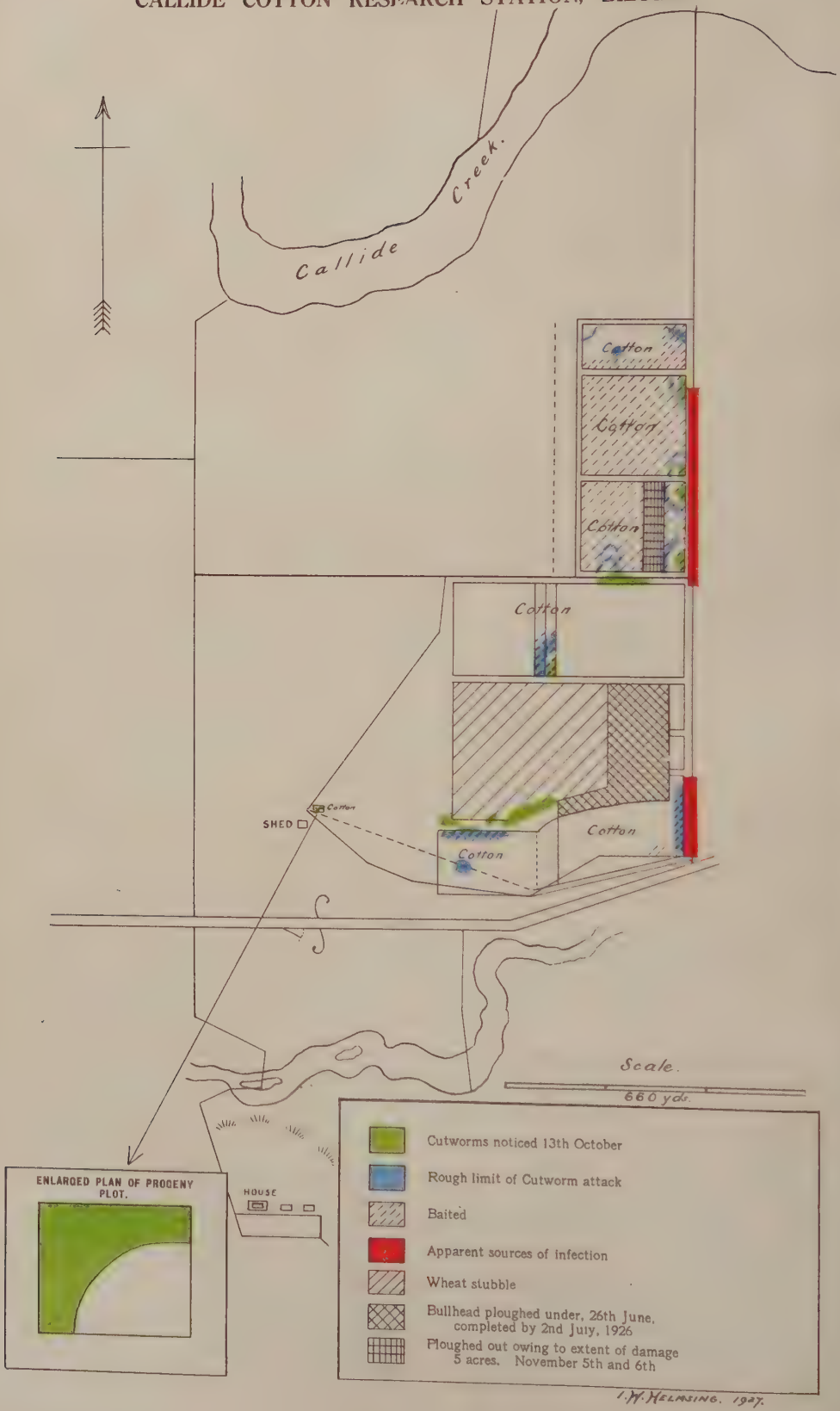
Natural enemies of the cutworms soon get to work and a second serious attack after the first outburst seems rare, although caterpillars can be found on headlands and weedy paddocks through the summer.

For next season the proposal is to work along the following lines:—

(1) Bearing in mind the marked preference shown for bull head and pigweed, to keep all fallows as clean as possible.

(2) To plough a steep-sided furrow along headlands, to catch invading cutworms after the crop is planted.

CALLIDE COTTON RESEARCH STATION, BILOELA.



I. M. HELMSING. 1927.

(3) This furrow might be baited with Paris green and bran or pollard. (Half to full grown cutworms will readily eat bait which is quite dry and which has been lying in the field for some ten days.)

(4) If an invasion does take place it will only be necessary to put bait in front of the advancing cutworms, and not to cover the whole field.

When baiting, little heaps should be put by the stem of each plant so that the cutworms must find them on their way to feed at night.

Dusting very young plants with calcium arsenate appears to be useless as their leaves will not hold the dust as they do when they are older.

The accompanying map shows the cultivation at Biloela and the cutworm invasions. This is very typical of other farms examined in the vicinity.

To recapitulate: Provided that the paddocks are clean cutworm attack will only come from weeds on the headlands, and the favourite food plants are bull head and pigweed. Attacks may generally be expected in October and perhaps early in November. One or two cases of cutworms damaging crops were reported in January.

After the first emergence of moths and the subsequent egg laying, the natural enemies of the cutworm get to work and soon make themselves felt. These enemies include so far as we have found this season:—

(1) An egg parasite. This was abundant in December.

(2) A small Braconid wasp which parasitized the half-grown caterpillars. This was rather rare in the Callide, but very common on cutworms collected at Gatton.

(3) A Tachinid fly, also a parasite of the caterpillars but not very common.

(4) A predatory wasp. This wasp was present at Biloela in very large numbers and collecting cutworms steadily during November, December, and January, although it was not so common during the latter month. None of these parasites has yet been identified.

(5) The onset of rain and high atmospheric humidity in the middle of December made it very difficult to rear cutworms in the laboratory, whatever precautions were taken to keep them dry. It is possible that excessive moisture has the same adverse effect on them as it does on corn earworm, the symptoms shown by the dead caterpillars being very similar.

In the summer months the life of the cutworm occupies just about seven weeks from egg to moth, thirty days being passed as a caterpillar. The stages which do the most damage appear to be during the last fifteen days—i.e., from stage three onwards.

It is not yet known how long the hibernation period is nor when it begins, nor the temperatures which would induce it. It seems probable that, after a mild winter like 1926, cutworm attack could be expected earlier than after a severe winter when the soil was colder and would take longer to heat up to the temperature necessary to induce moths to emerge.

During the last cutworm outbreak, an interesting observation was made when it was found that a plot of ratoon cotton was attacked and very badly damaged before the cutworms moved on to the plant cotton.

This is worth recording as it has been stated that ratoon cotton is not attacked.

The younger that plants are when the cutworms begin to eat them, naturally the more serious is the result, but more advanced plants do not feel the loss of the leaf nearly so much.

At Biloela in November it was known that cutworms were present in one block as the predatory wasps were hunting there all day and in large numbers, but the damage was nowhere appreciable. Fortunately it is rare for *Euxoa radians* to girdle the young cotton plants, although it does sometimes happen. This habit is far more serious than that of eating the leaves, and is common with other species. The problem before the cotton farmer seems to be to keep his fallows clean and also the growing crop so that moths are not tempted into the fields to lay, and to protect the young plants from invasions from headlands or neighbouring paddocks.

So long as moths can be prevented from laying their eggs in the cotton fields when the expense of widespread baiting would be involved, it is a comparatively simple business to check an invasion from the headlands, as only a small part of the field would have to be baited. The two most dangerous weeds are bull head and pigweed.

The bait formula has often been given, but is repeated here:—Bran or pollard, 25 lb.; Paris green, 1 lb. Mix well together. Then add water sweetened with molasses so as to make a mash which will just crumble in the fingers. Put little heaps at the foot of each plant in the neighbourhood of the invasion and for a short distance ahead of it in the evening. Be prepared to repeat the application in a week's time. Do not wait for an attack before buying Paris green. Have it ready for instant use.

THE CUTWORM MENACE.

FARMERS PROTECT YOUR SEEDLING COTTON!

Every year some damage is done to cotton seedlings by cutworms. These cutworms are greyish-brown caterpillars about 1¼ inches long when full grown, and represent one of the four stages in the life cycle of a moth.

The cutworm moths have been observed to lay their eggs under weeds on the headlands, &c.

On hatching from these eggs the young caterpillars move into the cotton fields and eat the leaves of the seedlings.

TO AVOID TROUBLE FROM CUTWORMS THE FOLLOWING MEASURES ARE RECOMMENDED.

Plough a deep furrow round the field immediately after planting; the steep side of the furrow next to the crop.

This may frequently effectively stop the advance of the caterpillars, but if necessary sprinkle poison baits along the bottom of the furrow when the attack is actually in progress.

Keep the fallow and newly-planted fields free from weeds or centres of attack may be found *inside* the crop.

If an attack inside a field is noticed, scatter poison baits over the whole affected area and a few yards beyond.

Don't wait till the damage is done before taking action. Be on the look out for an attack *from the moment the seedlings come through the ground* until they are 6 inches high.

Poison bait formula:—

Bran	25 lb.
Paris green	1 lb.
Molasses	1 quart

Mix bran and Paris green together dry, then add molasses and water till mixture is moist and crumbly but not wet.

Warning.—Paris green is very poisonous, and must be kept away from poultry and other live stock, as well as human beings. It will not harm the skin when handling.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the Month of July, in the Agricultural Districts, together with Total Rainfalls during July, 1927 and 1926, for Comparison.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	July.	No. of Years' Records.	July, 1927.	July, 1926.		July.	No. of Years' Records.	July, 1927.	July, 1926.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·90	26	2·16	0					
Cairns	1·57	45	2·02	0·27	Nambour	2·92	31	0·30	1·34
Cardwell	1·39	53	2·04	0·63	Nanango	1·74	45	0·55	1·02
Cooktown	1·00	51	1·20	0·50	Rockhampton ...	1·46	40	2·27	0·26
Herberton	0·72	40	1·85	0·26	Woodford	2·48	40	0·49	0·43
Ingham	1·52	35	3·10	0·67					
Innisfail	4·67	46	6·76	2·69					
Mossman	1·42	14	1·48	0·10					
Townsville	0·56	56	5·26	0·19	*Darling Downs.*				
					Dalby	1·77	57	0·41	0·64
					Emu Vale	1·58	31	0·84	1·23
Central Coast.					Jimbour	1·62	39	0·27	0·38
					Miles	1·69	42	0·07	0·30
Ayr	0·65	40	4·13	0	Stanthorpe ...	2·07	54	0·10	1·65
Bowen	0·93	56	2·49	0	Toowoomba ...	2·08	55	0·52	0·89
Charters Towers ...	0·62	45	2·63	0·17	Warwick	1·84	62	0·46	0·92
Mackay	1·67	56	3·29	0·13					
Proserpine	1·30	24	3·61	0·24					
St. Lawrence ...	1·28	56	3·38	0·06	*Maranoa.*				
					Roma	1·49	53	0·16	0·18
South Coast.									
Biggenden	1·42	28	0·70	0·55					
Bundaberg	1·89	44	1·06	0·18	*State Farms, &c.*				
Brisbane	2·28	76	0·52	0·85					
Caboolture	2·27	40	0·52	0·57	Bungeworgorai ...	1·73	12	0·10	0·12
Childers	1·77	32	1·43	0·92	Gatton College ...	1·45	27	0·14	0·36
Crohamhurst ...	2·97	35	0·47	1·00	Gindie	1·04	27	0·11	0
Esk	2·02	40	0·80	0·60	Hermitage ...	1·81	20	0·76	0·98
Gayndah	1·49	56	0·99	0·34	Kairi	1·25	12	1·54	0·36
Gympie	2·21	57	0·46	1·05	Sugar Experiment Station, Mackay	1·50	29	3·07	0·07
Kilkivan	1·79	48	0·63	0·20	Warren	1·27	12	1·05	0·13
Maryborough ...	1·94	55	0·81	0·99					

Note.—The averages have been compiled from official data during the periods indicated; but the totals for July, 1927, and for the same period of 1926, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Meteorologist.

PLATE 60.—AT THE INAUGURAL CEREMONY.

The Show was opened officially by Lord Stonehaven, Governor-General of Australia, on 10th August.

From left to right: ——, Sir John Goodwin (Governor of Queensland), Hon. W. Forgan Smith (Acting Premier of Queensland), Mrs. W. Forgan Smith, Mrs. S. M. Bruce, the Right Hon. S. M. Bruce (Prime Minister of the Commonwealth), Lady Stonehaven, Lord Stonehaven, Lady Goodwin, Mr. Ernest Baynes (President of the Royal National Association).

ROYAL NATIONAL EXHIBITION.

QUEENSLAND'S GREAT ANNUAL AGRICULTURAL EVENT—THE FRUITS OF FARM AND FIELD, OF SOIL AND TOIL, GIVE EVIDENCE OF THE ATTAINMENT OF HIGH STANDARDS OF HUSBANDRY—THE ALLIANCE OF THE SCIENTIST AND THE FARMER—THE STATE'S GREAT ADVANCE IN RURAL AND COMPLEMENTARY URBAN INDUSTRY MADE MANIFEST—ANOTHER SUCCESS ADDED TO THE LONG RECORD OF THE ROYAL NATIONAL ASSOCIATION.

This year's Brisbane Show, held on 8th August and following days, was a revelation of the enormous natural wealth of Queensland and her extraordinary productive capacity, even in a year of unusual dryness.

The inter-dependence of rural and urban industry; the intricacies of commerce as applied to primary production; the principles and practice of modern farming; animal husbandry in all its branches; the mechanisation of agriculture; the extent of Queensland's rural wealth were all typified, represented, or demonstrated.

In huge daily crowds, prosperous-looking and orderly, were reflected the general happy social conditions ruling in the Queen State of the Commonwealth.

A week of brilliant weather completed the success of the Exhibition which, from every point of view, was equal to the high standards set by the National Association in previous years.

BRIGHT days and cloudless skies, with just that suggestion of wintry keenness that makes the mid-year months in Queensland so delightful, was Nature's generous contribution to the success of this year's Exhibition. The Show was opened officially by the Governor-General of Australia, Lord Stonehaven, on 10th August, in the presence of a large crowd, which included many notable visitors from the Southern States.

The Court of the Department of Agriculture and Stock; the pine forest in miniature of the State Forestry Service; the comprehensive district exhibits; the "one-man farm" exhibits, each in itself a microcosm of a country show; the competitive entries in the agricultural produce section; and the Rural Schools' display were the outstanding pavilion features. Out in the arena were paraded representatives of fashionable Herd-book families. Coming under the critical scrutiny of some of the best stock judges in Australia, they survived the test with honours. Some of the most successful breeders from other States who were present were not slow to express their satisfaction with the quality of Queensland purebred stock in every section. Blood and draught horses, worthy representatives of their respective breeds, won public as well as judges' commendation. A remarkably fine troop of police horses bred at the Government Remount Station, of the type that has won fame for the "waler" wherever horses are spoken of—the type that proved its mettle on the long desert marches in Sinai and Palestine at the time when the Australian Light Horse, with other units of British cavalry, made history as the greatest mounted field force the world has known—was immensely popular.

A group of Clydesdale sires which have been placed by the Queensland Government at the disposal of farmers for farm horse improvement commanded equal attention, and shared in the appreciation evoked by the police remounts.

This year the spacious John Reid Hall and its associated annexes were occupied by the Chamber of Manufactures with some impressive displays of secondary products made in Queensland.

Temperate and tropical fruits, in extraordinary variety and excellence of quality, also provided evidence of the wide range of climate and richness of soil which Queensland enjoys.

In the following pages many of the exhibits are reproduced pictorially. Our photographs are the work of Mr. H. W. Mobsby, F.R.A.S., F.R.G.S., artist and photographer to the Department of Agriculture and Stock.

Included in the gathering at the opening ceremony, besides the Governor-General and Lady Stonehaven, were the Governor of Queensland, Sir John Goodwin, and Lady Goodwin; the Deputy Premier and Minister for Agriculture and Stock, Hon. W. Forgan Smith, and Mrs. Smith; the Prime Minister of the Commonwealth, the Right Hon. S. M. Bruce, and Mrs. Bruce; the President of the Royal National Association, Mr. Ernest Baynes, and Mrs. Baynes; the Under Secretary for Agriculture and Stock, Mr. E. Graham; the Assistant Under Secretary, Mr. Robert Wilson; the Director of Agriculture, Mr. H. C. Quodling; the Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby; the Chief Inspector of Stock, Major A. H. Cory; the Acting Director of Fruit Culture, Mr. George Williams; the Chief Supervisor of Dairying, Mr. E. McGrath; Mr. W. A. Affleck, and the Secretary of the Royal National Association, Mr. J. Bain.

THE MEAT INDUSTRY EXHIBIT.

AN EDUCATIONAL EYE-OPENER.

The importance of the meat industry in its present condition of primary production and home consumption was brought home to everyone who had the good fortune to see the wonderfully complete exhibit in the new Meat Hall at the Exhibition Ground. The real educational eye-opener, however, was the extraordinary range of the utilisation and manufacturing sides of the industry it illustrated, and it may be fairly claimed that no one left the Meat Hall without at least some vision of pastoral possibilities in Queensland and the meat industry as a basis for widely embracing home manufactures. The interdependence of primary and secondary industry could not have been exemplified more impressively, and the exhibit had its lessons, not only for producers but to statesmen as well. As an industrial trophy it was a triumph, and all concerned in its organisation and display won warm public appreciation.

THE EXHIBIT DESCRIBED.

As the visitor entered the main door he was struck by a slogan which fittingly described all the exhibits in the building: "The outcome of scientific and industrial research which shows no signs of approaching its ultimate boundaries." On the top of this slogan there was the Australian coat of arms, the flag of our land, and the head of a bullock.

The most prominent feature was a refrigerating case, designed by Wildridge and Sinclair, Limited, to stress the importance of the application of mechanical power in refrigeration, to which the development of the live stock and meat industry in Australia has been largely due. Exhibited in a most attractive manner within the case were sections devoted to beef, mutton, and pork, and a Lightfoot (Linde) refrigerator installed by Wildridge and Sinclair, Limited, was in operation day and night.

Mutton and Beef Sections.

In the mutton section the exportable qualities were shown, and a demonstration given of the economical cutting of carcase mutton and lamb. This section was of great educational value, showing, as it did, how to secure the utmost value from the carcase and at the same time give to consumers the choicest cuts. Smallgoods, such as tongues, trotters, frys, kidneys, brains, and so on, short sirloin, cutlets, and neck chops, formed an attractive embellishment to what was unquestionably the finest mutton display that has ever been seen in Australia.

In the beef section American exhibition methods had been copied with advantage, and the cuts employed in the famous Smithfield meat markets, London, were prominently shown. A complete side of beef was displayed in a prominent position, and the cutting demonstration cleverly lined out from a bullock which, in general principles, represented a type of cattle that must be produced in Australia if we desire to maintain our export trade. In addition to the main sectional cuts of buttock, rump, loin, rib, and chuck, there was an exhibition of round rump, Porter-house, and sirloin, while the bigger joints were represented by silverside, sirloin, roast, rolled rib,

standing rib, and brisket. The smallgoods subsection was also very interesting, ox tongues, brains, sweetbreads, hearts, kidneys, thick skirts, and so on being shown. It was a demonstration of the technique of cutting, and taught the lesson that producers must keep up the quality for the home and export markets.

Pork Exhibit.

There is a tremendous co-operative interest in the pork industry in Queensland, and the splendid exhibition of products from what is described in the Meat Industry Hall as "The noble vertebrate" was an education to all those interested in pig-raising, and the general public also learnt many things it did not know. Sides of the pig were attractively displayed in a semi-circle. A full carcase of the animal was in the centre, and the cuts—cheek, cushion, rib, chops, loin, leg of pork, and the hand and spring were shown, together with cutlets, kidneys, trotters, and so on. A humorous touch was introduced. Three porkers, reclined on a bed of grass, oblivious to the interest that visitors to the Show were taking in their slaughter. A ticket asked visitors to "Please go away and let us sleep."

Over the refrigerating-room, 30 feet by 8 feet, there was a striking pictorial display in cut-outs of pure breed baby beef cattle, the Hereford forming the two centre pieces, flanked on either side of the polled Angus and the Shorthorn. The artist succeeded in making these cut-outs very life-like. There was no mistaking the youth of the beasts, which represented the absolute standard of perfection of their type—the stars to which all breeders must hitch their waggons.

Meat Industry Board's Display.

Another very fine exhibit was that of the Meat Industry Board of New South Wales. The public abattoirs at Homebush Bay, Sydney, were represented by a diorama of striking beauty. The visitor was told, by attractive posters, that the Homebush Abattoirs is not a State concern. There is slaughtering and killing accommodation for all the butchering interests of Sydney, as well as facilities for supplying the killing and refrigerating needs of the New South Wales export trade. Situated within 1,600 acres of pastoral land, there is ample space for the resting of sheep and cattle. The Meat Industry Board claims that it has the largest by-product works associated with any public abattoirs in the world. One was told, further, that "the magnitude of the by-products treated at Homebush is due to the concentration of killing." Many of the by-products are absolutely unprofitable in small quantities, and can only be treated economically in a works which has a daily capacity of 1,500 cattle, 20,000 sheep, 3,000 pigs, and 2,000 calves.

Using By-products.

Among the by-products which are saved at Homebush and profitably treated are the pituitary, thyroid, and other glands, which provide the manufacturing chemist with raw material for the treatment of hypertensive and prostrate diseases of the human race. Rennet for the manufacture of cheese is another by-product which is rapidly capturing the export trade, and is very much appreciated on the other side of the world. Meat concentrates for the feeding of dairy stock, poultry, pigs, and sheep are prominently featured, and the Homebush Abattoirs claim to have led the world in this part of the industry. It claims to be the only meatworks in the world which has a specialised department for this work. Casings is another important by-product, and there is a wide range of dried gut products, power gut for the transmission of power in sheep-shearing and other machines, tennis racquet gut, violin strings, surgical gut, gold beater skins, and so on. It was a unique exhibit, and the whole arrangement was quiet and dignified, a colour scheme of blue and gold predominating. Revolving spheres symbolised the importance to civilisation of the meat industry in Australia. A striking pictorial centre-piece depicted the 1926 sheep dog trials at the Royal Agricultural Show in Sydney. Particular stress was laid on the fact that the Homebush Abattoirs is not a State enterprise, but a public utility, which aims at assisting the meat industry, without disturbing the law of supply and demand or hampering initiative or free competition. Among the by-products from cattle and sheep were tallow, oils, casing, fertilizer, meat extract, olio, stearine, olein, hair for the brush trade, and bone products of all kinds.

Trade Exhibits.

On the main background was a range of striking trade exhibits—domestic and toilet soaps, showing the process of milling and plodding soap, its cutting and pressing into tablets ready for sale; sheep and cattle leathers, in rainbow hues, indicating the many uses to which fancy leathers are put, cushions, table centres,

PLATE 61.

Top—Hacks and Ponies parading for Judgment. *Bottom*—Some of the Cattle in the Grand Stock Parade.

PLATE 62.—UP FOR JUDGMENT!

Top—Ayrshire Sires undergoing a Critical Scrutiny.
Centre—Jerseys were Strong Favourites.
Bottom—Shorthorn Aristocrats from Fashionable Families.

wallets, ladies' handbags, boots, and shoes. The woollen exhibits showed the process of manufacture from the time the wool is taken from the sheep's back until it is turned into finished suitings or flannel. The intricacies of the weaving industry were shown in a revolving pyramid of flannels, in many colours—blankets, rugs, suitings, and dress materials were displayed.

Margarine was exhibited prominently, and the visitor shown the uses to which animal oils can be put. There was a wide range of boot and shoe exhibits, showing the technique that is now employed in the manufacture of leather in Queensland. The visitor had only to examine the examples of Australian leather-wear critically to realise that the product of our factories outrivals the productions from the famous French and American factories. Canned meats were exhibited, and the process explained. Among the stock foods was an exhibit of "Kube," a new sheep food, which keeps flocks alive in drought time. On the opposite end of the hall to the refrigerating section, there was a very fine diorama of Swifts' works on the Brisbane River, with a view of the picturesque country in the distance, and a steamer lying at the wharf. In the pig industry section—the display dedicated to "the noble vertebrate"—the importance of the bacon industry was stressed in a manner that had not been attempted hitherto. All the main cuts, such as hams, middles, sides, flitches, and rolled bacon, formed the centre of a colourful display. Small goods, oils, and brawns flanked the two sides, while tinned meats were represented by tongues, camp pie, sandwich meats, and by-products of the hog house. Leathers—saddles, travelling bags, fertilizers, tallows, and crude oils, were also exhibited.

An Education—"Run Australian Industry on Australian Ball Bearings."

Of great educational value was the display showing the dependent and interwoven products of the meat trade. The diversity of the leather industry, and its close association with the live stock business, was stressed in a remarkable manner. There were beautiful examples of tan and black box yearling leathers, raw hides, yearling tan, willow calf, black willow calf, tan sole leather and chrome sole leather, belting for machinery, and laces of all kinds. A demonstration of shoemaking was given, and the tanning process was shown by actual examples of the hide in its transition from the raw material to the finished article. Glue, in association with the head and leg pieces from which it is derived, was exhibited in many forms, and several important grades of premier juice and tallow indicate the great importance of the fat and oil of bovine stock. Another interesting feature showed how the hoofs of cattle are decolourated and Prussian blue is obtained in the process, this colour being the base of our common washing blue. From the hoofs, buttons, combs, shaving brushes, and scores of other articles are obtained. On the opposite side of the centre-piece was an attractive soap exhibit, and gelatine, which was made from the sinews, and medicinal products derived from glands were also shown. Among the bone products were combs, knives, forks, spoons, shaving brushes, tooth brushes, knife handles, and the like, and the use to which bone is put in the hardening of steel was also stressed. The bone is subjected to terrific heat in order to give a deep carbon penetration, which makes possible the use of ball bearings in high speed machinery. Associated with this section was a slogan: "Run Australian industries on Australian ball bearings."

Sheep Industry.

The sheep industry was represented by a woollen centre piece, in which there was a fleece from the famous Glengallan Station, taken from sheep imported into Australia by the late J. B. Bettington, of Hunting Park, New South Wales, in 1842. Around it were the drawings, twistings, robings, and spinnings of the worsted process. Sheep leathers in many forms were also displayed, as well as glue, soap, gelatine, tallow, mutton, stearine, and medicinal products from the thyroid gland, lanoline and products, oil, glycerine, animal foods made from kibbled bone meal, meat meal, boveraline, ovavita, bone licks, and soap. There was an interesting display of Japanese soap made from Australian tallow. The packing is a close imitation of European methods. Boxing gloves, cricket pads, wicket keeper's gloves, tennis racquets, gold club grips, and hundreds of other articles show how wonderfully science has helped industry, and how many useful articles are made from by-products which, not many years ago, were thrown away as useless.

Three Important Points Strongly Impressed.

This magnificent display of subsidiary meat industries impressed forcibly on the mind of the visitor three points: **They provide a better price for cattle on the hoof; they lower the price of meat to the consumer, because, if they were not availed of, the revenue derived from them would have to be obtained directly from the consumer of edible meats; and their manufacture is playing no small part in making Australia a self-contained nation.**

PLATE 63.—THE "JOURNAL" ALCOVE.

A useful innovation in the Court of the Department of Agriculture. In the course of the Show the Bureau, in charge of Mr. Wilkie Lewis, became a recognised clearing house for Departmental information

THE AGRICULTURAL COURT.

REPRESENTATION AND REVIEW OF DEPARTMENTAL ACTIVITIES.

The Department of Agriculture and Stock again presented its annual display of primary products—tropical, sub-tropical, and temperate—together with striking examples of the work and progress of its highly trained and skilled scientific and technical services. Its agricultural extension efforts and effective publicity agencies were also fitly illustrated. In fact, the Departmental Court was really the Department itself in miniature, and even the most casual observer must have been impressed with the vast importance to the State of its wide-spread administrative and instructive activities.

Several sub-departmental sections contained excellent examples of the close attention bestowed on field and laboratory problems by departmental officers, and these included illustrations of the results of scientific research and field effort associated with Wool, Queensland Natural Grasses, Sugar, Wheat Breeding and Cultivation, Maize, Cotton, Dairying, Pig Raising, Poultry Farming, Power Alcohol Production, Broom Millet, Peanuts, and other crops, Entomology, Plant Pathology, and Publicity.

All these were arranged in practical order, and the wealth of Queensland soils and pastures was appropriately symbolised in striking trophies of artistic design, and set within the quadrangle in such a way as to compel attention and evoke admiration.

The colour scheme of the Court this year was a vellum tint and grey relieved with gold. Between each trophy were columns in stone supporting arches with light asparagus festooning. Palms and ferns added to the beauty of the decorative design. The experience gained at many international exhibitions, including Wembley and more recently the South Seas Exhibition at Dunedin, as Queensland representative, by the designer and display officer of the Court, Mr. H. W. Mobsby, F.R.A.S., F.R.G.S., was evident in the tout ensemble. He had to visualise the whole lay-out and design the floor plan and elevations of each setting for the display of products. His aim has been to make the Court each year, if possible, better than the last and thoroughly representative of the advance in Queensland agriculture in which the Department, under the direction of the Minister, Mr. W. Forgan Smith, takes a strong lead. The Department of Agriculture and Stock has now become one of the most important administrative and directional services in the State.

A new court feature this year was an Information Bureau, representing the Publicity Section and the "Queensland Agricultural Journal," at which was in attendance an officer who arranged interviews between visiting farmers and departmental specialists, and attended generally to the wants of the inquiring public.

CEREAL CROPS—EVOLVING NEW TYPES.

Maize.

The central feature at the Court of the Department of Agriculture and Stock was devoted to Queensland's principal cereal, maize. On this trophy was seen possibly the most comprehensive display of the kind ever shown at the Royal National. The quality, type, and uniformity of the grain afforded a striking example of what has been accomplished by the departmental maize specialist (Mr. C. J. McKeon) by scientific seed selection, a reflection of which was seen in the splendid exhibits of maize in the competitive sections at the Show. Each exhibit on the trophy was accompanied by descriptive labels setting out the fundamental principles of seed selection, which the grower can readily follow. Added interest was afforded by the knowledge that the Department makes a practice of supplying pure seed of these varieties to growers. One of the most significant exhibits illustrative of the valuable work accomplished by the maize specialist was the new variety, Durum maize, specially bred to meet the exigencies of the climate on the Atherton Tableland. In this locality one of the principal difficulties is to produce grain resistant to a form of mould (Diplodia), and of sufficient hardness and good keeping quality. So far the new strain has maintained the characteristic hardness of one of its parents, flint corn, and was exceptionally free this season (a reputably wet one) from Diplodia. A seed maize improvement scheme is being conducted by the Department on the forest country in the Atherton district with the object of propagating supplies of seed for local distribution from next year's crop.

Wheat Breeding.

This display dealt specifically with varieties of wheat bred at the Roma State Farm by the manager and wheat breeder, Mr. R. E. Soutter; also with other varieties from the Southern wheat-growing States, which have proved suitable for general

cultivation in Queensland. Centrally disposed on the exhibit was a chart of a wheat classification scheme prepared by officers of the Field Branch, which set out varieties recommended for planting in different districts; their period of development —early, medium early, mid-season, and late maturing; the correct period of planting; the soils that individual varieties are most suited for; and the texture of the grain of each kind of wheat. The chart in reality is a guide to growers. The important work of breeding varieties to suit Queensland conditions has been carried out by the Department for upwards of twenty years, and good work has been accomplished. Sixty per cent. of the wheats enumerated on the chart are departmental varieties.

Pure Seed.

Officers of the Field Branch are closely associated with the testing each season of a large number of new strains bred at Roma, which are tried out under different environment in a number of districts where their resistance to rust and field characteristics are made the subject of close observation. To conform to the standard required, "crossbreds" are tested from year to year, to gradually eliminate the unfit. Closely associated with this work is a scheme for the propagation of supplies of pure seed under an arrangement made between the Department and the Wheat Board, which pays a premium to growers who co-operate and undertake to deliver a proportion of their crop to the Board. In this way the purity and type of approved varieties are maintained, and supplies of clean and graded seed are thus available for further distribution, by which latter arrangement the more dependable kinds are gradually brought into cultivation. One very promising strain—combination of Cretan, Bunge, and Gluyas, which has stood out prominently in the field tests and is also resistant to rust—has been put into cultivation this season, and named "Duke of York," to synchronise with and to commemorate the date of the Duke's visit to Queensland.

OTHER PRODUCTS.

Northern-Grown English Potatoes.

The northern parts of the State are largely dependent on Southern-grown potatoes which are periodically shipped to suitable ports. An effort has been made by the Department, through its Northern Instructor in Agriculture, to encourage potato-growing with the object of making the North more self-supporting in the matter of its food crops.

Greater interest is being shown in English potatoes than formerly, and an increase in the area cropped is gradually taking place. Owing to climatic conditions in the more tropical belt the crop is grown in the autumn and winter. On the Tableland the planting seasons synchronise more or less with those of Southern Queensland. To keep up a continuity in the supply of seed a method of alternatively planting it on the Tableland and coastal land is being tested out.

Experiments in the cool storage of special varieties of seed potatoes have also been successfully carried out. In the variety trials conducted by the Department, where upwards of fifty different kinds of potatoes were grown, yields of several tons per acre were not uncommon. Some excellent samples were shown.

Yams.

Five different samples of North Queensland-grown table yams were on exhibition, comprising the following varieties:—South Sea Island, Rabaul, Trobiand, Mamie, Millie.

Although not grown in commercial quantities, yams of good flavour and quality are relished by those who are familiar with their use.

Wilt-Resisting Tomatoes.

The Bowen district supplies the Southern markets with large quantities of tomatoes which, in favourable seasons, exceed 200,000 cases per annum.

The Northern-grown crop is marketed before the Southern tomatoes are ready, with the result that prices are usually fairly good. Prior to the introduction by the Department of "wilt-resistant varieties" heavy losses were sustained by Bowen growers. The Northern Instructor in Agriculture (Mr. N. A. R. Pollock) has taken a keen interest in the introduction, testing, and subsequent distribution of seed of several varieties of tomatoes, which have been more or less adopted as standard, wilt-resistant types, the good flavour and carrying capacity of which have established an excellent reputation for Bowen as a tomato producing centre. The kinds in favour are Bowen Buckeye, Denisonia, Norton, Norduke, Columbia, and Moseley.

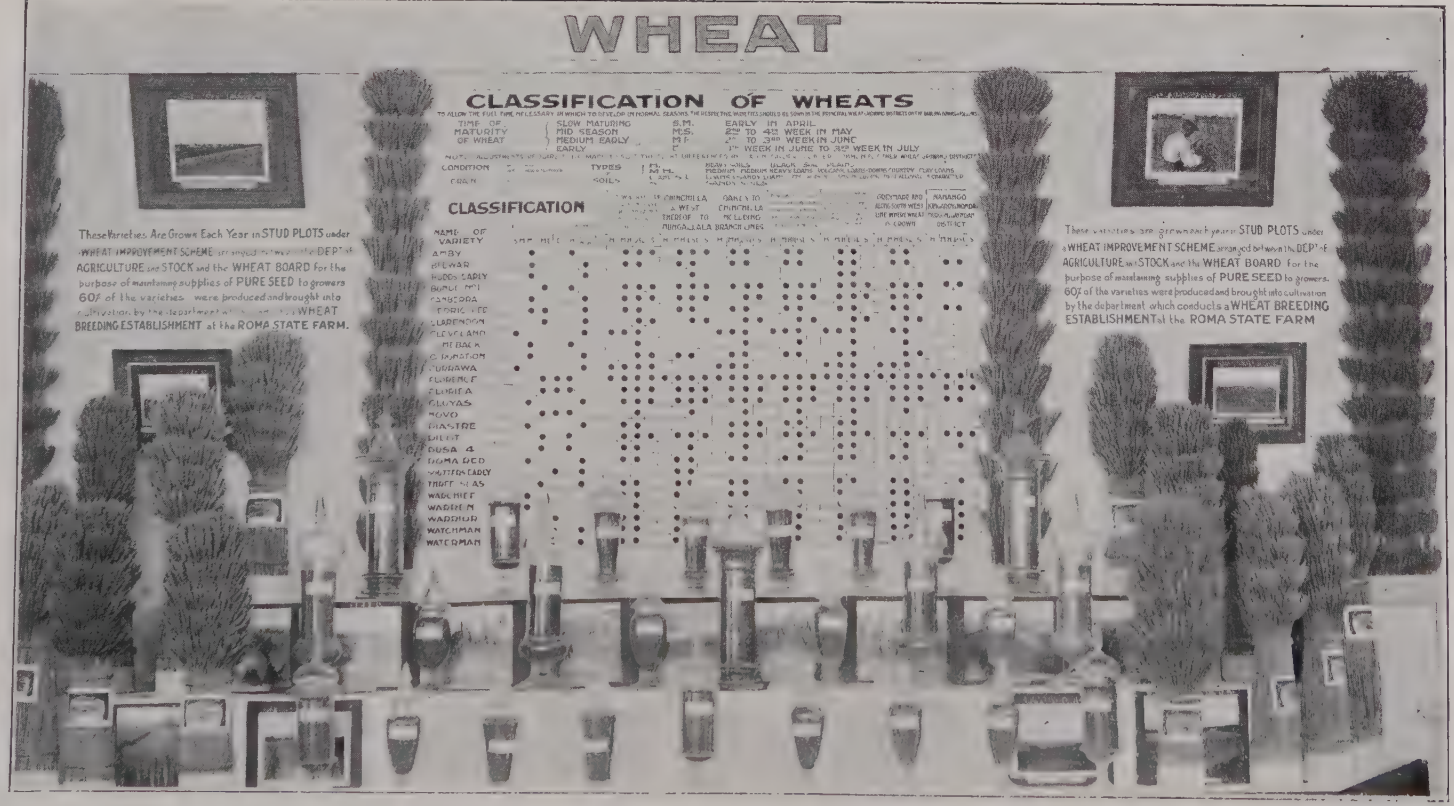

WHEAT
CLASSIFICATION OF WHEATS
CLASSIFICATION
These varieties Are Grown Each Year in STUD PLOTS under a WHEAT IMPROVEMENT SCHEME arranged between the DEPT of AGRICULTURE and STOCK and the WHEAT BOARD for the purpose of maintaining supplies of PURE SEED to growers. 60% of the varieties were produced and brought into cultivation by the department which conducts a WHEAT BREEDING ESTABLISHMENT at the ROMA STATE FARM.
These varieties are grown each year in STUD PLOTS under a WHEAT IMPROVEMENT SCHEME arranged between the DEPT of AGRICULTURE and STOCK and the WHEAT BOARD for the purpose of maintaining supplies of PURE SEED to growers. 60% of the varieties were produced and brought into cultivation by the department which conducts a WHEAT BREEDING ESTABLISHMENT at the ROMA STATE FARM

PLATE 64.—A POPULAR PANEL IN THE DEPARTMENTAL COURT.

Through systematic breeding the Department has been a forcing factor in quadrupling Queensland's wheat yield.

"Wheat, wheat, wheat! When it comes my turn to meet
Death the Reaper, an' the Keeper of the Judgment Book, I greet,
Then I'll face them sort of calmer, with the solace of the farmer,
That he's fed a million brothers with his wheat, wheat, wheat!"

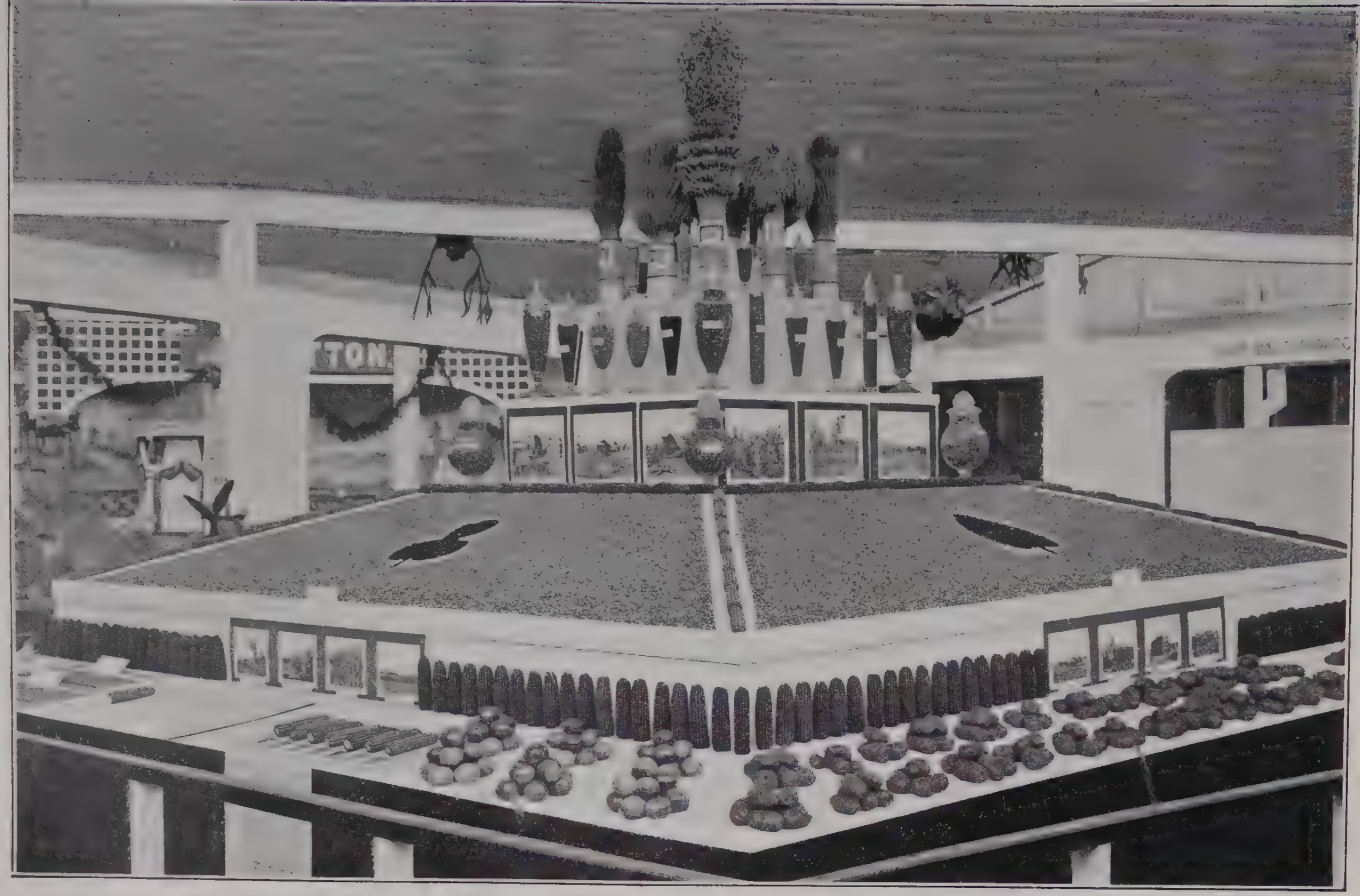


PLATE 65.—MAIZE IS KING. THE BEAUTIFUL CENTRAL FEATURE OF THE COURT OF THE DEPARTMENT OF AGRICULTURE.

This was regarded by experienced judges as one of the finest maize exhibits, from point of view of quality of grain and educational value in respect to seed selection, ever staged at an Australian show. The work of the Director (Mr. H. C. Quodling) and Field Officers of the Agricultural Branch, as illustrated by this and other excellent Court features, won widespread favourable comment from visiting farmers and others interested in rural progress.

Broom Millet.

The recent Commonwealth embargo prohibiting the importation of Broom Millet to prevent the introduction of the European corn borer, an insect the cause of widespread destruction in other countries, has given producers an added interest in this crop. A shortage of supplies manifested at the end of last season caused prices to rise and acted as an additional incentive to growers whose product is now marketed under the existing pool system.

It is recognised that bountiful summer rains and the existing favourable climatic and soil conditions are contributory to the production of good-quality fibre in Queensland. Unfortunately, many growers have shown indifference in the curing, classification, and get-up of their product, with the result that an industry which appeared directly capable of expansion is experiencing a pronounced check.

PLATE 66.—AN EDUC[illegible]AL EXHIBIT IN THE DEPARTMENTAL COURT.

Queensland grows her own millet and makes her own brooms—an advancing industry which illustrates the inter-dependence of healthy primary and secondary enterprise.

The primary essentials in working up a trade and extending it are to create a demand for goods of standard quality and of attractive appearance, and additionally to maintain supplies when repeat orders are received.

The short-sighted policy of growers in forwarding unclassed, discoloured, badly graded, irregular bundles similar to that on exhibition, which had been taken at random from the State Produce Agency's floor at Roma street—which is acting on behalf of the growers' own representatives on the Broom Millet Pool Board—is simply jeopardising prospects of finding and keeping suitable markets for Queensland's surplus broom millet.

To try and bring home the seriousness of the present position the Department exhibited a well-classed bale of millet alongside of the sample bundle referred to. The former class of bale can safely carry a distinctive brand and will command attention in any market. It was specially pressed for the purpose by one of the Departmental Agricultural Instructors within a rough timber framework, the pressure being supplied by a Wallaby Jack, a method of preparation within every growers' reach.

To make the Broom Millet exhibit as educational as possible a range of samples from one of the Department's experiment plots was displayed, and served to show the different grades and lengths of fibre into which a crop should be classed; also the kind and character of brush necessary when seed heads are being selected.

Officers of the Field Branch of the Department have been engaged for some years in the improvement in the yield and quality of Broom Millet fibre, which can only be brought about by adopting a system of rigid selection.

NATIVE GRASSES.

The value of wool exported from Australia for the last five years amounted to the grand total of £258,357,070, and practically all this wealth was primarily derived from indigenous grasses and pasture plants. If we add to wool the value of beef, mutton, and dairy products, the great value to Australia of good pastures is at once apparent.

Queensland's natural pastures are unrivalled, as the collection of grasses staged by the Department bears testimony.

There is no doubt that, with the extension of the grazing industries, the better grasses in some of the more closely settled areas have been eaten out, allowing coarser, less palatable species to grow; and the problem of pasture improvement is one worthy of research. A great deal can be done in the way of pasture improvement by judicious stocking and conserving and propagating the better species such as the Mitchell Grasses, Flinders Grass, Native Panic Grasses, &c.

Among the Andropogons exhibited with other specimens in the Departmental Court were the far-famed Blue Grass and the Satin Top, the former being one of the very best for fattening and grazing purposes. The genus Astrebla comprises the highly esteemed Mitchell Grasses, of which four very distinct kinds are found in Queensland. The chief characteristic of these and some other inland species of grasses and herbage is not only their drought-resisting properties, but also the rapid way in which they respond to falls of rain after long periods of drought, their value in this respect being nothing short of marvellous. Among the Star Grasses, to the same genus of which belongs the imported Rhodes Grass, are several sorts esteemed for their fodder value. The genus Anthistiria contains the well-known Kangaroo Grass and a near ally of this is the Flinders Grass which, both in a green and a dry state, is so much relished by stock. Quite an array of Panicums or Native Panic Grasses were on view, most of these grasses possessing high feeding values. Beautiful grasses and at the same time useful in the native mixed pastures are various species of Eragrostis or Love Grasses. The Button Grass and the Crow Foot are cosmopolitan species; the first mentioned is a most valuable sheep grass. Brown Top bears a good reputation among some stockowners. Several species of native paspalums were shown, some being of high food value, particularly for tropical parts. The native sorghums are coarse grasses, but when cut or grazed down, both horses and cattle do well on them.

The fact was impressed on visitors to the Show that the Department is always willing to identify and report on any specimens of grasses and other plants. Specimens may be sent to the Department of Agriculture and Stock, or direct to the Government Botanist.

POWER ALCOHOL.

Australia needs to be concerned in its fuel supplies for internal combustion engines when the fact is made known that the annual consumption of petrol in the Commonwealth is 124,000,000 gallons, 70,000,000 of which are imported from U.S.A. and 54,000,000 from the Dutch East Indies, and this huge consumption is on the increase.

Notwithstanding efforts made to locate petroliferous supplies in Australia and New Guinea, appreciable quantities are not yet available. Investigation and exploratory work is still proceeding with good prospects of ultimate success.

The commendable action of the directors of the Plane Creek Sugar Mill, at Sarina, in spending £120,000 in the erection of an up-to-date plant for the distillation of Power Alcohol from Molasses, and its adaptation for use when required for

PLATE 67.—QUEENSLAND'S WEALTH IN NATURAL PASTURES ILLUSTRATED.

An attractive panel in the Court of the Department of Agriculture. The total value of Australia's Wool Exports for the last five years amounted to a grand total of £258,357,000. Practically all this wealth came primarily from our rich indigenous grasses.

PLATE 68.—THE FUEL OF THE FUTURE—OIL FROM THE SOIL.

A new industry in the making. This panel of Tropical plants and their products was one of the most instructive exhibits in the Departmental Court.

the treatment of starch-producing crops for the same purpose, ranks as one of the most recent important industrial undertakings in the State. Operations were commenced in January this year.

Apart from certain financial assistance rendered by the Government to the company concerned, the Department of Agriculture and Stock has closely associated itself with the production of Cassava and other starch-producing crops. Last year an officer was sent to Java to study cultural conditions applied to cassava growing, and his mission also was to arrange for shipments of cuttings for planting out in the neighbourhood of Sarina.

One million cuttings of different varieties were subsequently imported and planted. Experiment plots for the carrying out of comparative trials and for the

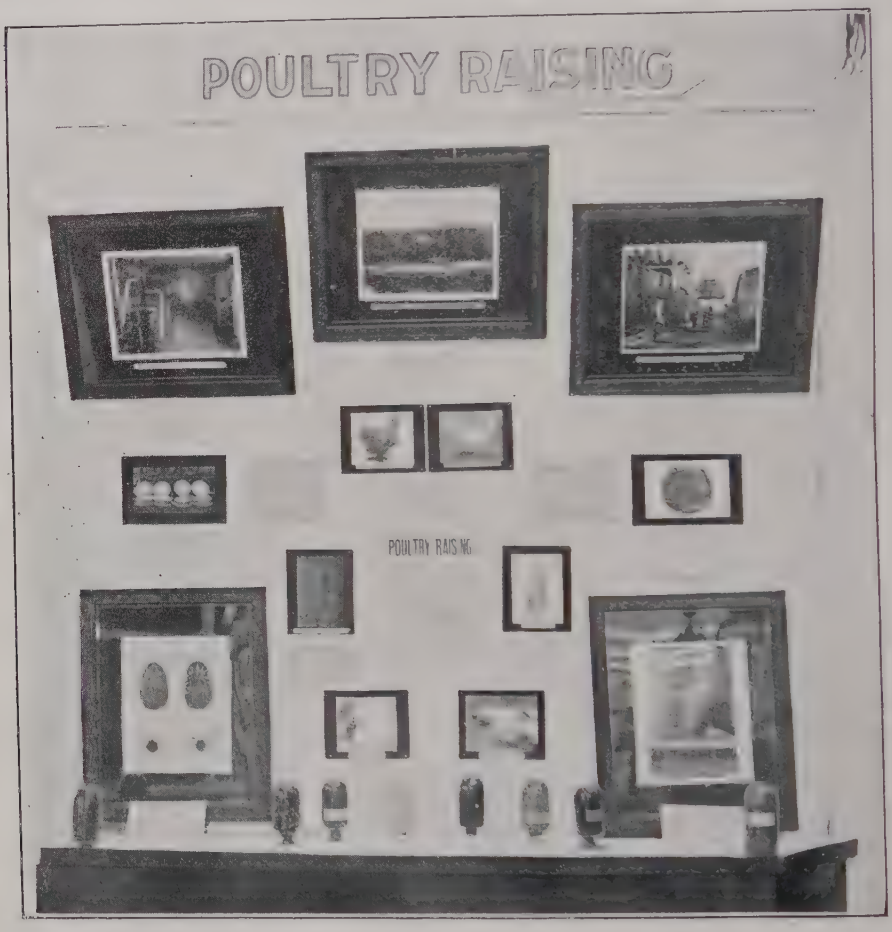


PLATE 69.—AN ILLUSTRATION OF DEPARTMENT'S EDUCATIONAL WORK.

Poultry raising is now recognised as one of the best farm side lines, and is approaching the status of a staple industry in Queensland. Its annual value to State is approximately £700,000, estimated conservatively.

testing of special varieties of Cassava were established. Other starch-producing crops, in the way of Arrowroot and Sweet Potatoes, are also undergoing trial. Data is not yet available to determine whether Cassava can be grown and utilised on an economic basis for Power Alcohol production. Some excellent crop yields were obtained at the various experiment plots, and plans have been formed to extend operations. All these activities were illustrated strikingly by a most instructive display of products and processes in the Departmental Court.

POULTRY.

In the Departmental Poultry Exhibit, Egg Laying Competitions were featured with the object of bringing out the points of careful breeding, which is necessary in the first place to make poultry profitable.

Another illustration was that of the Mammoth Incubator. A fine range of photographs showed the industry in its varied operations. Producers could learn from the exhibit that it is possible for them to buy stock from reputable breeders, thereby increasing the general productivity of their flocks without adding to the general labour on the farm.

The export of eggs was well featured. The growth of the industry has been remarkable during the last few years, necessitating heavy overseas export. The quality necessary was illustrated by a picture of the germ development of the egg. The poultry tick and its ravages also received prominence in the display. Pictures of this pest through its complete life cycle were shown, and when it is known that it is responsible for a loss to the poultry industry in Queensland of over £50,000 per annum, the prominence given to the question of the tick could be understood. Common diseases of poultry, and their more or less simple treatment, were also illustrated in an exhibit of high educational value.

QUEENSLANDS' WEALTH IN WOOL.

Many excellent exhibits of Queensland's great staple industry were included in district exhibits. The Department of Agriculture and Stock had a magnificent display in its Court, in which a highly educative trophy based on fleeces and pieces, arranged by the Instructor in Sheep and Wool, Mr. W. G. Brown and his assistant, Mr. J. Carew, was a conspicuous feature. Experts, both of the run and the wool room, were immensely pleased with its appearance and comprehensiveness. It was most elaborate, and wool information and samples were so tabulated and arranged as to convey to even the casual observer an idea as to the stages in sequence of converting wool from its greasy state to the finished fabric. Queensland being probably the finest Merino country in the world, samples of this wool predominated naturally. Coastal and crossbred wools were also displayed to advantage. All were bright, clean, fine up to superfine, and high-yielding—most attractive wools of the highest quality. "As good as any fleeces the Department has ever handled," was the verdict of Mr. Brown.

In the several district exhibits wool was a prominent feature. The numerous entries and fine exhibits indicated strongly the increasing bias of farmers and small holders generally towards sheep raising as an adjunct to their other undertakings. Wool in the Departmental Exhibit prepared by Mr. W. G. Brown were all typical Queensland wools, shown according to district of origin.

The operations of the Departmental Wool Scheme are extending rapidly. It is of great advantage to the smaller holders to have their wool handled well, and put in an attractive form before the buyers, and this work was well illustrated.

Other striking evidences of the activities of the Department in the Wool and Sheep Branch were well presented. Lectures, by radio and otherwise, practical advice and land inspection are all routine matters in this Branch.

SUGAR INDUSTRY.

Display by the Bureau of Sugar Experiment Stations.

The cane exhibited this year by the Bureau of Sugar Experiment Stations included a number of varieties from Hawaii, West Indies, Java, India, Mauritius, Fiji, and Queensland. The Queensland canes included a number of new varieties raised from seed at the Sugar Experiment Station at South Johnstone. Up to the present about 7,000 of these seedlings have been raised, but many of them, of course, are weeded out in the process of selection. Commercial trials of the best of them are now being undertaken. One of the objects of the Sugar Experiment Stations has been the introduction and testing of new varieties. Before any cane varieties are allowed to leave the Experiment Stations they have to pass chemical and commercial trials through plant, first ratoon, and second ratoon crops.

Each variety is tested not fewer than four times in the course of the sugar season, so that records are obtained giving farmers and millowners information whether canes are early or late, and whether their sugar contents are sufficiently high to warrant their adoption. This is combined with agricultural trials in the field, so that it may be determined whether such varieties are good croppers. They are further keenly watched for evidence of disease, and no affected canes are allowed to go into distribution. When varieties have passed these trials they are carefully examined and packed before being sent to growers living at a distance

PLATE 70.—FLEECES FROM QUEENSLAND FLOCKS—A STUDY OF "COUNTS" AND CLASSES IN THE DEPARTMENTAL COURT.

PLATE 71.—WHITE AUSTRALIA'S "WHITE HOPE."

Queensland's progress in cotton culture was illustrated in this artistically arranged exhibit in the Court of the Department.

from the stations. All canes are distributed free to canegrowers. The worthless varieties are discarded. Information of this kind could only otherwise be secured by growers and millers at the cost of much time and money, and the rejection of many useless canes by the mills, which would be accompanied by severe loss to the growers.

Full descriptions of the varieties exhibited appeared on the cards attached to the canes, which also give commercial cane sugar content. Many of these canes are at present undergoing chemical and field tests, while others have passed the probationary period and are being distributed to canegrowers. These varieties, however, included a very small part of the number of new and tested canes that have been distributed from the Experiment Stations in the course of the past twenty years.

Sugar-cane Propagation.

The Sugar Experiment Station at South Johnstone, near Innisfail, has, during the past six years, been engaged in the direction of raising cane from the seed found in the arrows. This requires the utmost care, as the seed is very minute and has to be handled most carefully. Specially prepared boxes of soil are used, which have previously been sterilised. The cane arrows, when mature, are gently broken off, spread over the soil, watered, and then covered with glass plates. When germination takes place, a large number of minute shoots like grass appear. When these have made further growth they are carefully pricked out into pots or boxes, and are ultimately removed to the field. Several of them which were taken from Badila cane have Badila characteristics, and it is trusted a cane equal to the Badila will be discovered.

Study of Soils.

Work at the Experiment Stations also includes the study of soils, cultivation, and fertilizing. It is sought to introduce improved methods of cultivation, liming, fertilizing, rotation of crops, and conservation of moisture, and growers are taught the principles of cultivation methods by visits to the Experiment Stations, by lectures and addresses delivered in the various sugar districts, and by the issue of bulletins. It is claimed that this work has been highly successful. The Sugar Experiment Stations analyse soils free for canegrowers, and give advice by personal interviews or by letter, on the requirements of the soil in the way of application of lime where necessary, green manuring and fertilizers, and the treatment of the land by proper soil handling. Upwards of 1,500 cane soils have so far been analysed. Cane samples are also tested free of charge, so that growers may know the best time at which to cut their cane. Field officers move around amongst farmers, giving advice on cultural operations.

Investigation and Research.

Investigation and research work in connection with the most serious pest of the sugar-cane, namely the grub, is now being carried out by the Bureau of Sugar Experiment Stations in a systematic manner, and numerous bulletins have been issued upon the subject. The entomological laboratories are situated at Meringa (near Cairns), and at Bundaberg. Chemical fumigants are being successfully used in the destruction of cane grubs. A pathological staff is being established to deal with diseases in cane, and travelling pathologists are advising cane farmers on disease questions.

The work of the Sugar Experiment Stations, in relation to the promotion of the agricultural welfare of Queensland, cannot be over-estimated. When it is considered that this industry is the greatest agricultural one in Queensland, and will produce about 430,000 tons of sugar this year, estimated to be of the value of over £9,000,000, it can be seen how highly necessary it is that it should be assisted and encouraged in every possible way. Apart from its economic value, however, it has a deep national significance, and has already played a very large part in peopling the North.

Sugar Belt.

Apropos of the sugar industry, it is to be noted, on reference to a map of the State, that the land in Queensland used for sugar-growing is included in a long narrow coastal belt. Parts of this belt are separated from each other by considerable tracts of non-sugar country. The latter, owing to a deficient rainfall or poorness of soil, are not utilised for cane. This belt is included between latitudes 16 degrees and 28 degrees south, and the bulk of the staple is grown within the tropics.

Rainfall.

The Queensland rainfall fortunately is highest during the summer period, at which time the cane plant makes its maximum of growth. The following are average rainfalls in the principal sugar-growing districts:—Cairns, 92.65; Johnstone River, 160.88; Herbert River, 84.91; Mackay, 66.67; Bundaberg, 44.40. Cane grows best when the relative humidity of the atmosphere is high, and this is the case during the wet season in Northern Queensland.

Queensland's sugar production in 1867 was 338 tons, and in 1925 reached 485,000 tons, the record crop to date.

The yield of cane and sugar per acre is improving, due to better methods of cultivation and growth of superior canes. The mills have also largely increased their efficiency, and over £1,000,000 have been spent during the past five years in improving existing mills, while, in addition, the Queensland Government have erected the most up-to-date sugar plant in Australia in the Tully River district.

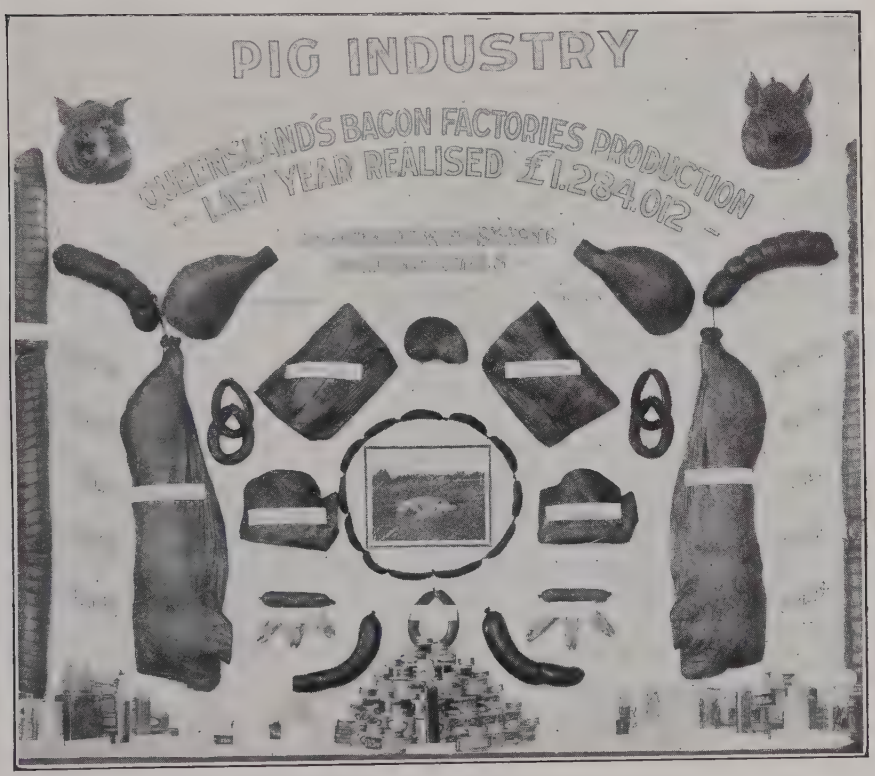


Plate 72.—Pigs for Profit. The Department's Educational Work Illustrated.

PIG RAISING.

From a financial point of view the pig industry at present represents, in round figures, a return to the State of well over £1,250,000 sterling annually, and the returns are increasing every year. That it pays to follow Departmental advice and breed more and better pigs on every farm is being advocated widely in every district throughout the State. Mr. E. J. Shelton, Instructor in Pig Raising, and his assistant, Mr. F. Bostock, again staged an instructive and attractive display in the Departmental Court, featuring the great variety of products manufactured or obtained from the carcass of the hog. The exhibit included the ordinary commercial products, hams, sides of bacon, flitches, shoulders, middles and rolls, arranged around a central enlarged photograph of a profitable and prolific breeding sow and her family not yet ready, but en route to the consumer's plate. Along with these products were shown numerous manufactured lines, including Strasburg and Devon sausage, ham delight,

and other varieties of small goods, pure lard and lard oil. Included in the canned goods section were camp pies, luncheon tongues, pork brawn, pork and beans, sandwich delicacies, and the like.

Surmounting the display was an attractively worded display scroll, indicating what Queensland's pork and bacon industry is worth to the State, while the total number of pigs in the State was also given. At the base of the display of manufactured lines of edible products were numerous inedible lines, including pig hair, glue pieces, trotters, sausage casings, blood and bone meals, and so on.

Display in Meat Hall.

Included in the great variety of products displayed in the new Live Stock and Meat Industry Hall was a comprehensive display of the products of the pig arranged by the Instructor in Pig Raising and his assistant, with the co-operation of representatives of the various bacon factories and the State butcheries. The display of fresh pork products, specially prepared and arranged under the supervision of Mr. Brunckhurst, the manager of the State butcheries, included every line catered for in the fresh pork trade as prepared from the carcases of prime-quality porkers, such

PLATE 73.—IN THE RING

Seated in the centre is Major-General Spencer Browne, the veteran horse judge who commanded a Brigade on Gallipoli, talking "horse" with other keen judges of the "waler" and the Clydesdale.

as are suited to the requirements of city, suburban, and country butchers, and small goods shops. These lines are all methodically arranged, leading off from an enlarged "cut out" of a prime-quality pig, such as is advocated for use in this business.

THE CLYDESDALES.

While, as is usually the case in an agricultural and sporting community, the horse section of the Show is exceptionally well catered for, special mention must be made of the magnificent display of Clydesdale draught horses at this year's Show. Seen in their stalls immediately prior to entering the ring for judging, these patient and enormous—one might almost say elephantine—beasts of burden presented a striking picture of power and muscle. And here, let it be said, for the benefit of those who regard the all-conquering motor as having swept the horse off the face of the earth for all utility reasons, that there is still work for the draught horse. It is stated that even in the city, where questions of short haulage are paramount, the gigantic Clydesdale is more economical and of more general use than the internal

combustion engine; and on the farm one ventures to think it will be long before these splendid friends of man are altogether displaced.

Great flanks shining, and manes and tails combed and curled, coloured woollen decorative effects serving as eye-catchers, the placid and gentle Clydesdales blinked sleepily at the observer, obviously quite unperturbed and unconcerned about their imminent fate at the hands of the judges. In some of the boxes prospective champions were accompanied by stable companions, whose rough and shaggy coats contrasted sharply with the well-groomed perfection of their mates. The Clydesdales were a living example in the equine world of how much breeding matters, even in "manual" toil, and no less care is expended on the pedigree of these magnificent specimens of their class than on that of our foremost blood stock racers. Last year's champion, Mr. James Sprott's The Intent, was again prominent, and it will be hard to find his equal, fine specimens as his rivals undoubtedly are. The stallions purchased by the State Government for the improvement of farmers' draught stock again came in for a full measure of admiration.

DAIRY CATTLE—HIGH STANDARD OF QUALITY.

What is rapidly becoming one of the foremost industries of Queensland is naturally exceptionally well catered for—the exhibit of dairy cattle. All the well-known breeds were in evidence, and competent judges agreed that the high standard of quality observed last year had been fully maintained. In fact, it is doubtful if such a fine collection of animals have ever been gathered together in one place in Queensland as were shown at this year's Exhibition. One of the conditions of entry was that each animal should be registered in a recognised herd book, and there is no doubt that the systematic testing of cattle, and the elimination of all those who are not "up to the job" from the herds, is having a great effect upon the milk production standard of the State. One of the features of the Show was the milking tests, which were conducted on the showground, under the supervision of officers of the Department of Agriculture and Stock. The exhibits were drawn from all the well-known dairying districts of the State—the North Coast and Brisbane Valley areas being exceptionally well represented. Altogther the dairy cattle formed one of the main features of the Show, and provided an interesting instance of the progress of dairying in the State.

Ayrshires.

Although the Ayrshire cow shows no signs of any falling off in popularity—there were ninety-two exhibits this year under the various classes—they have not yet reached that degree of popularity with breeders in this State which is so much in evidence with the Jerseys and Illawarras. It is almost unnecessary to say that a high standard of excellence was noticeable, as obviously breeders do not trouble to exhibit inferior cattle; but nevertheless a word of appreciation in regard to this breed would not be out of place. It is quite clear that a great deal has been accomplished in the efforts to establish them in Queensland, and they should go ahead rapidly in favour among dairy farmers. Messrs. Anderson Bros., of Southbrook, Jonas Holmes, of Pittsworth, and Thomas Holmes, of Yarranlea, were the biggest exhibitors in this class. On the small side, like the Jerseys, they are just as distinctive in appearance, and some very fine types were numbered among the exhibits, notably Mr. Jonas Holmes's Tilly of Longlands, last year's champion Ayrshire cow.

Illawarra Shorthorns.

By a very large margin the Illawarra milking Shorthorn maintains its popularity among dairymen. The reason is not far to seek, and for the benefit of the uninitiated it may be explained that while the Jersey and Guernsey give the highest cream content in their milk, and the Friesian probably the largest actual quantity, the Illawarra has succeeded in combining to the best possible effect both qualities. There were no fewer than 313 specimens of this breed exhibited, and they were fully representative of all the dairying districts of the State. Last year's champion cow, Mr. A. J. Caswell's Rosie IV. of Greyleigh, was again before the judges, together with many other representatives of the well-known Greyleigh herd. The Oakvale, Blacklands, and Sherwood studs were among other celebrated studs in evidence.

Jerseys.

Second only to the Illawarras, the Jersey breed, with 198 exhibits in the various classes, fully sustained its well-deserved popularity. The onyx-eyed, calm little Jersey cows give no idea from a casual glance of the enormous value in cream content of the milk they produce in such rich quantity. Lacking the impressive size

PLATE 74.—A WHITE MAN'S INDUSTRY IN A WHITE MAN'S LAND.

No other agricultural enterprise in Australia employs so many Australian workers. The great results obtained by the Bureau of Sugar Experiment Stations through systematic plant improvement and constant field effort, illustrated. The Sugar Industry is worth nearly £9,000,000 a year to Queensland.

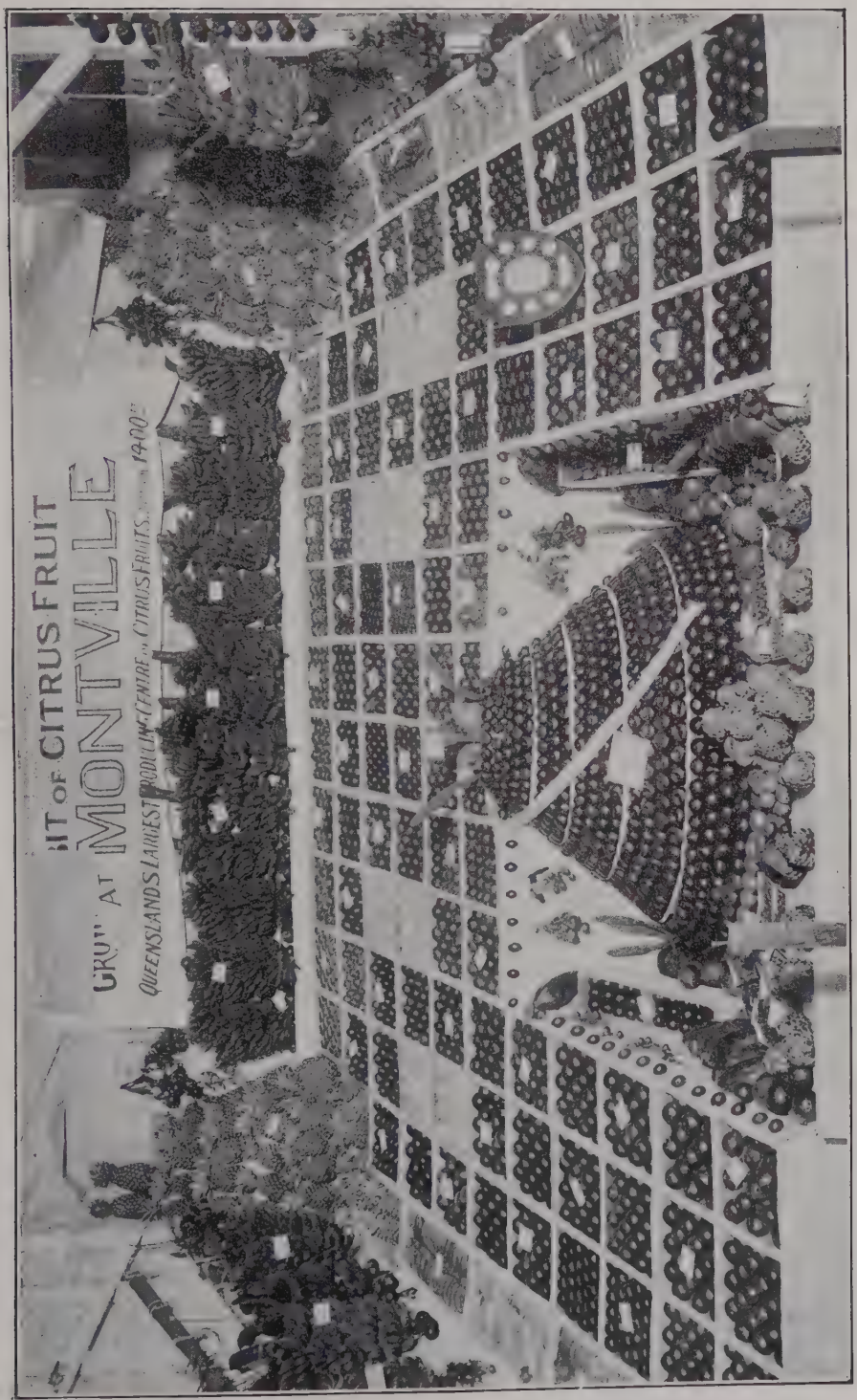


PLATE 75.—FRUITS OF QUEENSLAND FROM THE FERTILE NORTH COAST.

of the Illawarra, their dun-coloured flanks gently heaving as they reflectively chew their cud, there is little outwardly impressive, apart from their beauty, about them. All last year's owners and breeders were represented, and to the casual spectator this class provided one of the most interesting of them all.

Guernseys and Friesians.

These classes of dairy cattle were not particularly well represented as to the number of exhibits, there being only three exhibitors in the former class. This would seem to show that the Jersey, whose main characteristics are practically identical, prevents the spread of popularity of the neighbouring Channel Islander. The class of cattle exhibited, however, was up to last year's standard, and indeed, if anything, was considered by judges to show considerable improvement. The Friesian was more in favour, with a total number of exhibits in all classes of eighty-one cattle. They appeared to be spread well out over the various districts from which they are drawn, and, like the other classes, many fine and valuable specimens were paraded for judgment.

DISPLAY OF THE FORESTRY SERVICE.

A Jungle in Miniature.

The Queensland Government Forest Service is an industrial tree farming and sawmilling corporation charged with the control and management, under the Minister for Lands (Mr. T. Dunstan, M.L.A.) of 5,000,000 acres of landed estates for the production of timber and forest products for the needs of Queensland.

This intimation introduced the Forest Service exhibit at this year's Show. Among the gay array of white toned displays in the pavilion the State Forestry Court loomed rather grimly as a sombre forest interior from whose green glooms projected the brown boles of tall timber, their heights are lost among their interlacing boughs overhead. Among these trees rank upon rank of hoop pines in pure sand, one might walk softly on the forest duff down canopied aisles filled with the lengthening shadows of tree trunks and dappled with such thin sunlight as succeeded in filtering down through the embowering foliage. Here and there in this Araucarian timberland great russet-barked logs of tallowwood lay prone, where the fallers and haulers had left them. Staghorns and elkhorns glinted greenly from the forest roof, and one felt that one, perhaps, even as these fallen trunks, may rest awhile from the clangour of the side shows, in this jungle quietude conjured for us there in the pavilion by the Queensland Forest Service.

Sylvan Depths.

Each year the Forestry exhibit assumes new aspects, but no more dignified presentation of the forests come to town has been yielded to show visitors than this one of 1927. The effect of cloistered sylvan depths was immense. The purpose was to reveal to the passer-by the appearance of a forest plantation of Queensland pine fifteen years after the winged, brown seed has been sown in the nursery beds. Seven by seven feet apart, these trees stood, solid trunks of grown wood, 40 to 50 feet in height, and 15 to 35 inches in girth. Such a forest plantation as this has been actually produced by the Queensland Forest Service at its Wongabel reservation in the Atherton district, and this early experimental effort gives assurance that in the new forests of man's creation now being produced there can be grown ample softwood for Queensland's future.

The Forestry Court tree plantation was life size and life like, and the atmosphere was real. But lest by its reality it should be imagined that there was a young forest slaughtered to make a Brisbane holiday, let it be known that it was just a clever reconstruction from material gathered together from felled scrub land awaiting the clearing fire.

Jewel House of the Woods.

Through the dim forests of stems in this Forestry Court one perceived in the far background, in a glare of light, the russet glint and slanted outline of a bark hut. It was, indeed, a jewel house of the woods, for there were housed the gems of the forestry collection, a dazzling array of brilliant wood wares, of costly trays inlaid with Queensland timbers of rich and varied hues and grain, of cabinets and cases carved from rare products of the Queensland forests, of lustrous walking sticks in ring gidyea, plumwood, red satinay, walnut, bean, and tulip oak; of polished turnery in black ironbox and rose walnut, and what not; creations to delight the craftsman in wood and the connoisseur in timber; treasures, indeed, of the Queensland forests, and tributes to the little army of wood artists now appearing in our midst to deal adequately with them.

By contrast, alongside existed a corner in ruder wood wares, sawn board products of the Queensland Forest Service sawmills and timber yards, which seek to inculcate

in the building public an appreciation of economy and efficiency in wood used in house construction. Witness "A" quality sawn hoop pine for linings, expensive stuff, indeed, and visitors were asked to compare its painted and unpainted surfaces with those of "C" quality alongside and only half its price. They were asked to regard similarly flooring pine of "B" and "C" grades side by side, half of each stained and polished, and consider the effect of the marked difference of cost. Or make the comparison odious, perhaps, for the imported wood, of selected merchantable Queensland pine for concrete work, against Oregon of similar class. Also displayed were the ordinary and the new Brennan butter box as now being turned out in thousands by the Government Forest Service band sawmill at Yarraman, which is cutting 25,000 to 30,000 superficial feet of timber a day.

In solitary state, salmon-pink, silken-rippled, and chaste, a beautiful circular occasional table stood among the cheap-grade building woods. It was a product of red satinay, of which 60,000,000 feet stand awaiting the saw in the State forests of Fraser Island. The Victorian Railways have pioneered this new cabinet wood by ordering large quantities of it for carriage panelling in place of Queensland maple silkwood. It remains now only for Queensland itself to discover it.

Service Activities.

Around the dim green walls of the Exhibition forest were hung pictures in black and white illustrative of the activities of the Queensland Government Forest Service, this industrial corporation of State timber farming and sawmilling, managers of the 5,000,000 acres of the Crown forest estates. Surveying, road-mending, logging, sawmilling, nursery work, and tree planting were among the operations photographically represented in this art gallery of the trees. Ranged in rows beneath the pictures were polished panels of some of the ornate woods of Queensland.

In a corner were massed living products of the forest nurseries, seedlings of hoop and bunya pine, of silky oak and grey teak, little green babes of the wood destined to go to the saw in thirty to fifty years' time to build the homes of our grand-children. Beside them was a motley collection of wee foreign treelings of pinus species, the pinus of the Canary Islands, of Florida, and of the Himalayas, and of California, rivals of the Queensland treelings for a place in the new man-made forests of to-morrow.

Plate 76.—This Fine Exhibit was from the State Cannery.

PLATE 77.—HOW QUEENSLAND FARMERS ARE SERVED BY SCIENCE. ECONOMIC ENTOMOLOGY ILLUSTRATED IN THE DEPARTMENTAL COURT.

Plate 78.—Dairying Bacteriology—The National Service of Science Illustrated in the Departmental Court.

QUEENSLAND AGRICULTURAL COLLEGE.

WORK OF STUDENT FARMERS.

A practical demonstration of the students of the Queensland Agricultural High School and College was illustrative of the work done in every department of the College at Gatton.

Various fodder crops grown by the pupils occupied the centre stand in the display, and arranged between sheaves seeds raised were displayed. These included wheat, maize, barley, rye, sorghums, cowpea, and various grasses.

Numerous students at the College intend ultimately to concentrate on growing sugar-cane, and for their instruction there is a section on the farm on which numerous varieties of cane are raised. Their efforts as exhibited were worthy of commendation. Wool from merinos, crossbreds, and Corriedales, shorn at the College, was shown in profusion, and the labelling gave complete descriptions of the process of teaching young farm learners all that is essential about sheep rearing.

The Department of Agriculture has a cotton experiment station at the College, and from it was drawn some choice bolls of the Acala variety. Fodder conservation is receiving particular attention, and the demonstration was used to impress upon farmers the need for greater reservation of surplus produce in good years. Ensilage was shown stored in a model silo, a miniature of the one built at the College. Suitable types of fodder for storage also were displayed.

Cleansing Milk.

Clean milk is required in the interests of public health, and one section of the display was intended to teach dairymen how to separate small, unhealthy particles from the milk. There were on view Wisconsin sediment strainers, one showing the unused cloth and the other the quantity of dust particles cleaned from one pint of milk. These made an interesting comparison.

Various types of cream and milk cans were shown to demonstrate the necessity for using such as will not hold germs in seams. The latest type of English milk pail, rarely seen in Australia, was on the dairying stand contrasted with the popular types in use in Queensland.

Complete tuition in dairying is given at Gatton. There is a model butter factory there, and the student is enabled to proceed from instruction in milk production to the actual work of making butter. Apart from the College, milk supplies are obtained from forty-five outside dairymen, and the butter is marketed on a business basis. Several boxes of butter were on view, and in front of these were a number of cheeses made at the College. These included Edam, Cheddars, brick, and club cheese.

There was a number of interesting chemical appliances on view, including those used for the distillation of petrol and crude oils, the determination of fats in foods, and the determination of volatile fatty acids. To illustrate capillary attraction there were a number of long tubes. These showed the rate at which water rises in various types of soils.

Farm engineering was given a large space in the display. It contained models of engines, pumps, sections of farm plants, gear chains, and safety valves of bearings. The necessity for correct lubrication was eloquently shown by specimens burnt at the ends, whilst alongside are the true parts.

Tree Dentistry.

Models of silos, swingle bars, hay sheds, and feed rooms, all made by the students, were staged in the carpentry section, and close by there were samples of work done by junior pupils in the tinsmith shop. Work done in the smithy was on view, and these show that a high standard of skill has been reached by the pupils. Similarly leather work was of a high order of merit.

According to the specimens shown, tree dentistry has become a science. The filling of dangerous cavities with cement or other substances is carefully done, and correct methods in pruning and grafting were told with the aid of interesting specimens of the students' work.

Bee keeping, the extraction of honey, and the manufacture of wax, together with appliances necessary in the industry, were shown in an informative way.

In every section the College display was interesting and comprehensive, but it was robbed of much of its attractiveness by the poorness of the accommodation.

Canvas walls do not help the organisers in the difficult task of making the display attractive, and the importance of the work warrants a better domicile. Those who supervised the staging of the exhibit were Messrs. F. O. Bosworth (English master), J. W. Howie (Horticultural Instructor), and R. Keats (Dairy Instructor).

DAIRY BACTERIOLOGY.

The dairy bacteriology display in the court of the Department of Agriculture and Stock was arranged principally for the purpose of demonstrating the necessity of efficient cleansing of the various utensils used in the dairying industry, as many imperfections in dairy products—milk, cream, butter, and cheese—are associated with, and in most cases due entirely to, bacterial agency.

As a result of carefully conducted experiments, it was shown that large numbers of germs survive in milk and cream cans which have been apparently well washed and rinsed with boiling water. Milk and cream cans are only efficiently cleansed when subjected to live steam for three minutes.

Plate and tube cultures taken from rinsings from improperly cleansed milk and cream cans showed gross contamination with various micro-organisms. These were contrasted with similar plates and tubes prepared from rinsings from efficiently cleansed and sterilised cans.

One important section of the exhibit demonstrated that milk in the cow's udder is germ free, and only becomes contaminated after it is drawn. By adopting precautionary measures it is possible to obtain from the cow germ-free milk which will keep indefinitely at any temperature. To illustrate this, samples of milk had been drawn with precautionary measures direct from the cow into sterilised receptacles in May and July last, and were still perfectly sweet, while samples drawn on 7th August without precautionary measures directly into unsterilised receptacles had turned sour.

Micro-Organisms.

Cultures of micro-organisms isolated from contaminated milk and cream are capable of producing: (1) Ropiness in milk and cream; (2) a tallowy taste in butter; (3) sponginess and gas formation in cheese. Organisms which are found in contaminated water, and are likely to produce faults in dairy produce, were exhibited. There were also shown various moulds and colour and unpleasant odour producing bacteria which have been found associated with dairy products.

Pure lactic starters for the ripening of cream in the manufacture of butter, the more general use of which must result in the production of improved flavour and aroma, had a place in the exhibit.

The practical benefits of pasteurisation applied to cream and milk demonstrated that practically all bacteria which otherwise may produce unpleasant flavour, aroma, &c., are destroyed. Details of a simple method of home pasterisation also were clearly set out.

The causative organism of contagious mammitis (streptococceal) was shown growing in artificial media, and the methods of controlling the disease by hygiene and vaccine treatment were described.

YOUNG JUDGES—TESTS AT THE SHOW.

Organised by Mr. P. Frankel (Royal National Association Vice-President), the young judges' competitions now form an important and popular section of the Royal National Show. They are not only creating more interest and keener competition each year among the young farmers and intending farmers of the State, but the standard of the work of the competitors is much higher.

The classes this year provided for the judging of Clydesdale stallions, Shorthorn bulls, Hereford bulls, Ayrshires, Jerseys, Illawarra Milking Shorthorns, Friesians, Guernseys, Berkshire boars, and Tamworth boars. All classes were open to persons not over twenty-five years of age, including students attending Agricultural Colleges, young farmers, and farmers' sons. Winners of judging competitions at any previous Royal National Show were not eligible to compete in similar classes at this or future Shows.

The entries in each section were exceptionally good, particularly in the Illawarra Milking Shorthorn class, for which there were no fewer than eighteen competitors as

PLATE 79.—BETTER COWS ON THE FARM IS THE OBJECT OF THE DEPARTMENTAL HERD TESTING SCHEME. Concrete results are evident in this display of High-class Dairy Products, a distinctive feature of the Court.

PLATE 80.—THE COW AND THE PLOUGH.

Their importance to the nation was demonstrated in this striking exhibit in the Departmental Court. The Dairying Industry is now worth six and a-half millions sterling to Queensland annually.

compared with eleven last year. The entrants in each class included several students from the Queensland Agricultural College, Gatton, where the value of actual judging and handling of the animal by each student is fully recognised.

Seven young men took part in the judging of Shorthorn bulls. With two exceptions the competitors were students from the Queensland Agricultural College. The judge, Mr. G. B. Waller, of Wallarobba, New South Wales, had selected three young bulls, and the competitors, who were required to place the beasts in their order of merit and also state their reasons for so doing, were allowed fifteen minutes in which to carry out their task.

Keen Competition.

The competition was remarkably keen throughout, and a subsequent examination of the papers showed that they were exceptionally good, the difference between the first four papers being very small. C. Tilley, of Gatton College, was the winner, with R. P. Hughes, Hendon, and Reg. A. Price, Gatton College, equal for second place.

In announcing the results, Mr. Waller congratulated the lads on their good work, remarking that the papers showed that they evidently had a proper grasp of their subject. Some of the competitors, however, had made the mistake of giving rather too much prominence to details that were not essential. They must always remember to take into consideration the main features of the animal—viz., the character, lines, and flesh. He also recommended the young judges to depend on their fingers, and not their eyes, in judging cattle. Their eyes might deceive them in the finer points of an animal, but their fingers never would.

Mr. Waller explained in detail his reasons for placing the animals in their respective places, and highly complimented T. Graham, of Gatton College, on his fine description of each beast.

HORTICULTURE.

The Horticultural Pavilion at this year's Royal Show was again a beauty spot, where a wonderful wealth of blooms greeted the eye. A special feature was an excellent exhibition of sweet peas, a long stand, running the whole length of the pavilion, being occupied by these beautiful, vari-coloured winter blooms. The entry in the sweet pea class was very satisfactory, and the judge (Mr. F. Phillips) had a difficult task set him. He said that the peas were of a very high standard this year, which was incidental to Queensland, this State possessing the ideal climate for the growth of winter-flowering sweet peas. Many new varieties were shown, and they compared very favourably with some of the older varieties, all combining to make a fine centrepiece in an admirable collection of choice products of the home garden.

The colours of many of the sweet peas this year were uncommon, showing that growers of this choice winter flower are ever on the alert for new varieties. The rose exhibits were also excellent, and an improvement on last year's display, and better than was anticipated, considering the unfavourable weather. As a matter of fact, the quality of the roses all round was superior to any shown at the Brisbane Exhibition for the past three years. The several classes were also well filled, considering that the entries had to be in so early. The outstanding roses were a Frau Karl Druschki, exhibited by Mrs. Proctor; a George Dickson, a Rhea Reid, and a Mrs. Herbert Stephens (the latter three being exhibited by Mrs. J. Willis). The other classes of cut flowers made a fine showing and the novice classes were well filled. A very fine non-competitive display of pot plants, ferns, and flowers, &c., was staged by Mr. M. G. Rose, of Northgate Nurseries, the exhibit being well arranged, and of a most comprehensive character. In the class for pot plants there was unfortunately little competition, one exhibitor (Mr. Henry Jarrett) taking the bulk of the first prizes.

The Horticultural Society's competition, open to suburban and country competitors, which should draw a good entry, was unfortunately not a success in this connection, Toowong's being the only entry received, and it was an admirable exhibit, nicely arranged, and reflected great credit on the growers who participated in the collective exhibit. The Horticultural Society's competition is certainly worthy of better patronage, and it is hoped that next year a more satisfactory entry will be forthcoming, as this class provides plenty of scope for the individual exhibitor to make a name for his particular locality by contributing to a collective exhibit. The display in the Horticultural Pavilion at the Brisbane National Show is improving every year, and the question of providing more accommodation for the horticultural classes will soon arise.

PLATE 81.—THE QUEENSLAND BOY AND HIS INDUSTRY.

The work of the Rural Schools in its wide range and practical efficiency formed one of the most attractive exhibits at this year's Show.

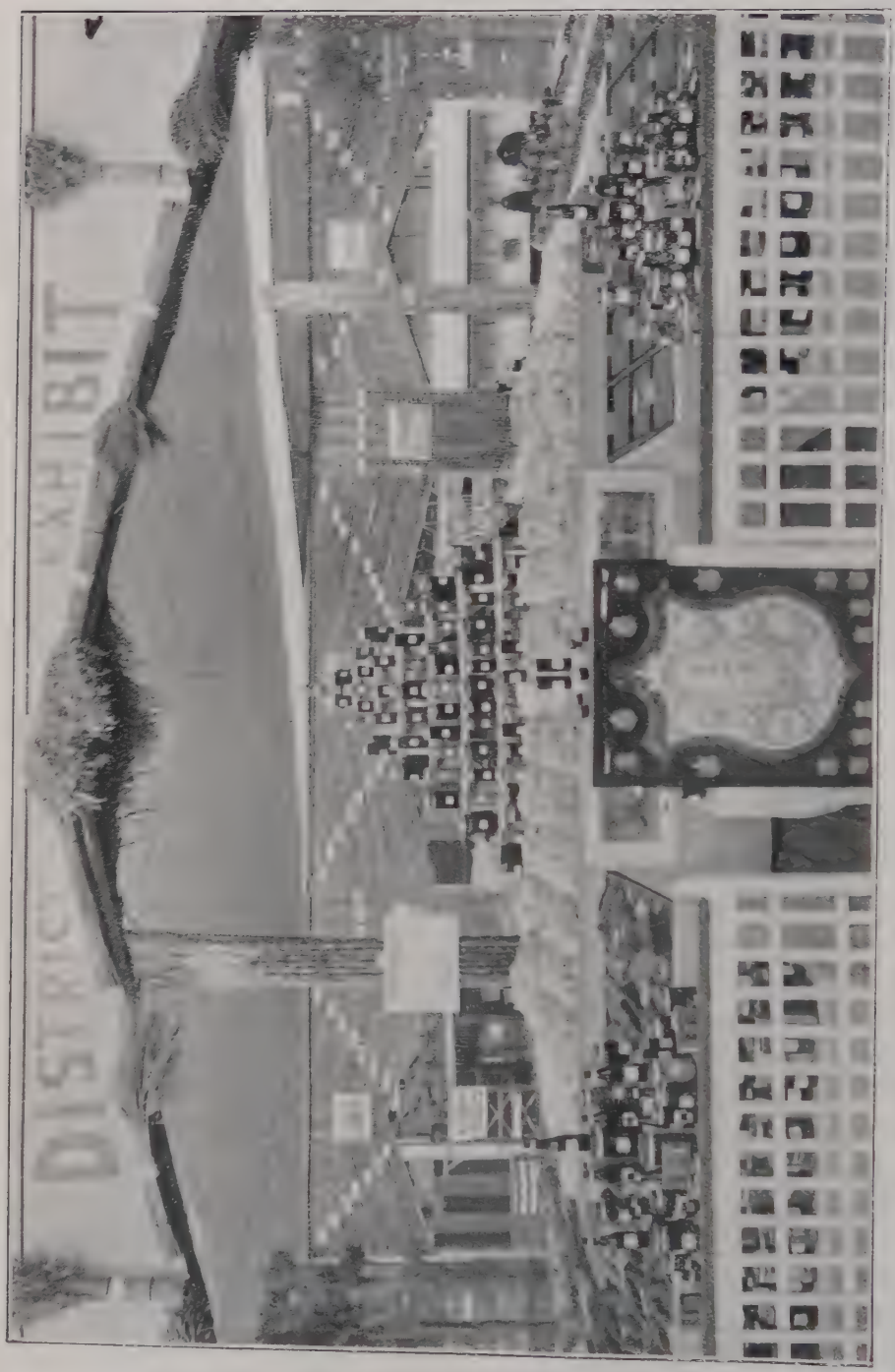


PLATE 82.—THE WINNING DISPLAY IN "A" GRADE DISTRICT COMPETITIONS. THE EXHIBIT FROM THE NORTH COAST DISTRICT OF NEW SOUTH WALES.

THE AWARDS.

DISTRICT EXHIBITS.

A GRADE.

The winning honours in the coveted Chelmsford Shield in the competition for District Exhibits of primary products and manufactures at this year's Exhibition were awarded to the magnificent display from the North Coast and Tableland of New South Wales. Its grand aggregate of points was 1,223 out of a possible aggregate of 1,572. The Wide Bay and Burnett District was second in the aggregate with 1,181 points. Details:—

	Possible Points.	Wide Bay and Burnett District	North Coast and Tablelands of N.S.W.	South Coast of Queensland.
Dairy Produce—				
Butter, 1 box, 56 lb.	90	84½	85½	85½
Milk (condensed, concentrated, or dried), and by-products	40	10	38	5
Cheese, not less than 1 cwt.	60	48	50	45
Eggs, 1 dozen	20	14	10	16
Totals	210	156½	183½	151½
Foods—				
Hams and bacon	50	46	40	47
Rolled and smoked beef and mutton	20	15	..	18
Smallgoods and sausages, if smoked or preserved	10	8	6	9
Fish—Smoked, preserved, or canned	10	7	6	6
Canned meats	25	10	15	20
Lard, tallow, and animal oils	20	18	12	14
All butcher's by-products	10	8	7	8
Honey, and by-products thereof	20	17	18	13
Confectionery, factory made	10	3	4	5
Bread, scones, biscuits, and cakes—factory made	10	5	5	7
Totals	185	137	113	147
Fruits, Vegetables, and Roots—Fresh and Preserved—				
Fresh fruit—all kinds	60	57	46	52
Preserved fruits, jams and jellies	30	22	28	22
Crystallised and dried fruits	20	10	18	..
Fresh vegetables, all kinds, including table pumpkins, but excluding potatoes	25	18	20	17
Preserved and dried vegetables, pickles, sauces	10	8	10	8
Potatoes, English and sweet	40	30	35	26
Roots (*see* reg. 4), all kinds and their products, including meals (1 lb. each) arrowroot, cassava, &c.	14	12	7	10
Cocoanuts, peanuts, and other nuts	10	6	8	3
Totals	209	163	172	138

DISTRICT EXHIBITS (A GRADE)—*continued.*

—	Possible points.	Wide Bay and Burnett District	North Coast and Tablelands of N.S.W.	South Coast of Queensland.
GRAIN, ETC.—				
Wheat	50	30	47	28
Flour, bran, pollard, macaroni, and meals prepared therefrom	10	9	6	8
Maize, 3 cobs, and ¼ bushel of each variety	50	38	45	32
Maizena, meals, starch, glucose, and corn-flour	10	6	5	5
Oats, rye, barley, malt, pearl barley, and their meals	30	20	27	20
Totals	150	103	130	93
MANUFACTURES AND TRADES—				
All woodwork	30	27	18	15
All metal and ironwork	30	25	20	28
Leather and all leather work and tanning	20	16	20	19
Manufactured woollen and cotton fibre	30	15	25	20
All tinwork	10	7	8	10
Artificial manures	10	6	2	9
Brooms and brushes	10	3	6	8
Manufactures not otherwise enumerated	15	14	13	15
Totals	155	113	112	124
MINERALS AND BUILDING MATERIALS—				
Gold, silver, copper, and precious stones	25	20	11	7
Coal, iron, other minerals, and salt	30	22	9	9
Stone, bricks, cement, marble, terra-cotta	20	10	10	15
Woods—Dressed, undressed, and polished	25	22	23	22
Totals	100	74	53	53
TROPICAL PRODUCTS—				
Sugar-cane	60	53	55	40
Sugar, raw and refined	20	12	12	8
Rum, other spirits and by-products	10	10	8	9
Coffee (raw and manufactured), tea, and spices	10	6	5	3
Cotton (raw) and by-products	30	20	20	25
Rubber	10	10	..	..
Oils (vegetable)	10	10	10	..
Totals	150	121	110	85
WINES, ETC.—				
Wines	15	8	9	5
Aerated and mineral spa water, vinegar, and cordials	10	6½	7	6
Ales and stout	10	7	..	..
Totals	35	21½	16	11
TOBACCO—				
Tobacco (cigar and pipe), in leaf	20	10	15	15

DISTRICT EXHIBITS (A Grade)—*continued.*

	Possible Points.	Wide Bay and Burnett District	North Coast and Tablelands of N.S.W.	South Coast of Queensland
Hay, Chaff, Etc.—				
Hay—Oaten, wheaten, lucerne, and other varieties	30	17	29	15
Grasses and their seeds	10	6	9	5
Chaff—Oaten, wheaten, lucerne, and other varieties	50	36	42	36
Ensilage and other prepared cattle fodder	20	15	8	8
Sorghums and millets, in stalk	10	8	7	5
Commercial fibres (raw and manufactured)	10	6	9	8
Pumpkins and other green fodder	10	6	8	7
Broom millet, ready for manufacture	10	8	6	4
Farm seeds, including canary seed	13	10	11	8
Totals	163	112	129	96
Wool, Etc.—				
Scoured wool	40	37	40	37
Greasy wool	60	50	60	47
Mohair	10	8	7	7
	110	95	107	91
Enlarged Photographs	5	3	5	2
Effective Arrangement—				
Comprehensiveness of view	20	19	19	16
Arrangement of sectional stands	25	22	24	19
Effective ticketing	10	9	10	8
General finish	25	22	24½	19
Totals	80	72	77½	62
Grand Totals	1,572	1,181	1,223	1068½

B GRADE.

In the very fine competition for Primary Products Only, the Brisbane Valley, which won the same competition in 1926, followed up that success with another first on this occasion. The runners-up were the Northern Darling Downs, who were in a similar position in 1926. Kingaroy exhibit was a meritorious third with an aggregate of 912 points. In the detailed points it is interesting to note that while Brisbane Valley and Northern Darling Downs went back in points on their 1926 figures, Kingaroy improved theirs. This will be better noted by a comparison of the figures of the two years of those three exhibits. They were, with 1926 in parenthesis, as follows:—Brisbane Valley 1,030½ (1,089½); Northern Darling Downs, 926 (964); Kingaroy, 912 (891). In the sectional points, some of the contests were very close. For instance, in Dairy Produce, there was only 13½ points difference between the first and the last of the five exhibits. Again, in the Food Section, the points awarded varied from 72 to 96. In some of the other sections there were similar keen contests. The detailed points are as follows:—

	Possible points.	Nanango District.	Oakey District.	Northern D.D. District.	Brisbane Valley District.	Kingaroy District.
Dairy Produce—						
Butter, one box, 56 lb.	90	83	84	84½	84	84
Cheese, not less than 1 cwt.	60	52	55	60	53	50
Eggs (suitable for domestic use)	20	12	12	16	18	17
Totals	170	147	151	160½	155	151

PLATE 83.—THE WINNING DISPLAY IN "B" GRADE DISTRICT COMPETITIONS—EXHIBIT FROM THE BRISBANE VALLEY.

DISTRICT EXHIBITS (B Grade)—*continued.*

	Possible Points.	Nanango District.	Oakey District.	Northern D.D. District.	Brisbane Valley District.	Kingaroy District.
Foods—						
Hams, bacon, rolled and smoked beef and mutton	50	35	36	41	40	42
Fish, smoked	10	..	5	4	5	4
Lard, tallow, and animal oils	20	15	15	15	18	17
Honey and by-products thereof	20	15	8	14	18	14
Confectionery (home made)	10	3	3	2	6	2
Biscuits, bread, cakes, and scones (home made)	10	6	5	8	9	7
Totals	120	74	72	84	96	86
Fruits, Vegetables, and Roots (Fresh and Preserved)—						
Fresh fruits, all kinds	60	30	30	52	57	50
Preserved fruits, jams, and jellies (home made)	30	20	20	23	26	20
Crystallised and dried fruits (home made or dried)	20	8	..	16	12	10
Fresh vegetables, all kinds, including table pumpkins, but excluding potatoes	25	16	14	18	20	16
Preserved and dried vegetables, pickles, sauces, home made or dried	10	5	6	8	9	7
Potatoes, English and sweet	40	30	22	24	33	32
Roots, all kinds, and their products, including meals, arrowroot, cassava, &c.	14	6	..	5	8	11
Cocoanuts, peanuts, and other nuts	10	4	3	3	7	8
Vegetable seeds	10	6	6	4	6	8
Totals	219	125	101	153	178	162
Grain, Etc.—						
Wheat	50	38	32	40	36	33
Flour, bran, pollard, macaroni, and meals prepared therefrom	10	7	9	7	2	6
Maize	50	44	28	32	45	46
Maizena, meals, starch, glucose, and cornflour	10	3	2	5	3	5
Oats, rye, barley, rice, malt, pearl barley, and their meals	30	18	12	23	22	20
Totals	150	110	83	107	108	110
Woods—						
Woods, dressed, undressed, and polished	25	21	20	20	22	23
Wattle bark	15	12	10	10	14	12
Totals	40	33	30	30	36	35
Hides, and Home-preserved Skins (for Domestic use)	15	15	5	12	15	10
Tropical Products—						
Sugar-cane	60	10	..	9	20	15
Coffee, tea, and spices	10	8	..	5	8	7
Cotton (raw) and by-products	30	20	12	20	20	15
Totals	100	38	12	34	48	37

DISTRICT EXHIBITS (B GRADE)—*continued.*

	Possible points.	Nanango District.	Oakey District.	Northern D.D. District.	Brisbane Valley District.	Kingaroy District.
MINERALS—						
Gold, silver, copper, and precious stones	25	11	2	6	13	12
Coal, iron, and other minerals and salt	30	13	10	12	14	12
Totals	55	24	12	18	27	24
TOBACCO—						
Tobacco, cigar and pipe, in leaf	20	12	8	12	12	10
HAY, CHAFF, ETC.—						
Hay—Oaten, wheaten, lucerne, and other varieties	30	21	20	22	27	20
Grasses and their seeds	10	8	7	9	8	7
Chaff—Oaten, wheaten, lucerne, and other varieties	50	40	22	35	44	30
Ensilage and other prepared cattle fodder	20	14	..	8	16	10
Sorghums and millets, in stalk	10	9	6	8	9	8
Commercial fibres, hemp, and flax	15	4	..	8	12	10
Pumpkins and other green fodder	10	9	9	7	8	7
Broom millet, ready for manufacture	10	9	6	9	9	9
Farm seeds, including canary seed	13	6	6	8	8	8
Totals	168	120	76	114	141	109
WOOL, ETC.—						
Scoured wool	40	37	37	35	36	36
Greasy wool	60	49	50	59	50	48
Mohair	10	9	..	9	7	7
Tofals	110	95	87	103	93	91
ENLARGED PHOTOGRAPHS	5	3	2	3	5	2
LADIES' AND SCHOOLS' WORK, AND FINE ARTS—						
Needlework and knitting	25	15	10	16	22	12
School needlework by pupils of schools in the district	5	3½	2	3½	4½	2
Fine arts	5	3	2	5	5	5
School work, maps, writing, &c., by pupils in the district	10	8	4	9	8	8
Totals	45	29½	18	33½	39½	27
GENERAL POINTS—						
Effective arrangement, comprehensiveness of view	20	18	15	18	19	16
Arrangement of sectional stands	25	21	15	17	24	16
Effective ticketing	10	8	6	8	10	8
General finish	25	22	16	19	24	18
Totals	80	69	52	62	77	58
Grand Totals	1,927	894½	709	926	1,030½	912

ONE-MAN FARM.

EIGHT FINE DISPLAYS.

The one-man farm exhibit contest at this year's Exhibition was productive of eight magnificent displays; a record for this section. Pride of place was awarded to Mr. H. Franke, who secured 473 points, with Mr. J. Beck a very good second, with 445½ points. The competition was very keen. Details of the awards are:—

—	Possible Points.	H. Franke.	E. J. Roscow.	W. D. Ponton.	L. D. Christensen.	J. T. Whiteway.	J. Lönges.	W. Brumpton.	J. Beck.
DAIRY PRODUCE—									
Butter, 6 lb.	25	17½	17	16½	18½	17½	18	17	19
Cheese, 1 large (10 lb.), or 2 small (5 lb.) each, home made	20	16	5	12	14	16	3	10	..
Eggs of domestic fowl ..	5	4	2	4	2	4	2	2	5
Totals	50	37½	24	32½	34½	37½	23	29	24
FOODS—									
Hams (15 lb.), bacon (15 lb.), home-cured ..	20	16	18	15	17	18	17	15	15
Corned, smoked, and spiced beef and mutton, 10 lb.	10	8	6	8	8	7	7	7	8
Honey, any variety, and by-products thereof ..	15	7	3	14	3	6	2	3	6
Beeswax, 6 lb.	5	3	2	4	2	2	1	2	2
Bread (2 loaves), and scones (1 dozen) ..	5	2	2	2	2	3	3	3	3
Confectionery and sweets, 3 lb.	5	3	1	2	1	3	2	1	1
Home cookery, including cakes, biscuits, and other foods	7	4	3	1	2	4	1	4	2
Lard, tallow, and animal oils	5	4	4	4	5	5	3	3	4
Totals	72	47	39	50	40	48	36	38	41
FRUITS, VEGETABLES, AND ROOTS (fresh and preserved)—									
Fresh fruits, all kinds ..	25	20	18	21	15	22	10	10	17
Crystallised and dried fruits	10	8	9	9	5	8	6	5	..
Preserved fruits, jams, and jellies	15	12	13	13	10	13	9	10	12
Fresh vegetables ..	15	13	8	7	8	11	6	5	9
Pickles and sauces ..	15	13	12	13	8	13	7	8	10
Potatoes and roots ..	25	22	17	16	16	10	11	10	23
Table pumpkins, squashes, and marrows, 56 lb. ..	10	7	8	7	7	7	6	6	8
Cocoanuts and nuts ..	7	3	3	3	5	6	3	5	3
Vegetable and garden seeds	5	4	4	5	4	4	4	3	..
Arrowroot, 10 lb. ..	5	4	5	4	5	5	..	3	4
Sugar beet, 3 lb. ..	5	5	..	..	5	..	5	5	..
Cassava, 3 lb.	5	..	5	5	5	5	..	..	5
Ginger, 3 lb.	5	..	..	3	..	5	2	..	..
Totals	147	111	102	106	93	109	69	70	91

PLATE 84.—MR. H. FRANKE'S FINE WINNING EXHIBIT IN THE "ONE-MAN FARM" COMPETITION.

ONE-MAN FARM—*continued.*

—	Possible Points.	H. Franke.	E. J. Rossow.	W. D. Ponton.	L. D. Christensen.	J. T. Whiteway.	J. Donges.	W. Brumpton.	J. Beck.
GRAIN, ETC.—									
Wheat	25	24	12	15	22	3	6	24	13
Maize	25	25	18	20	20	16	12	8	24
Barley, oats, rye, and rice	20	17	6	17	12	7	4	12	18
Home-made meals from above varieties of grain	10	8	10	8	8	9	7	10	9
Totals	80	74	46	60	62	38	29	54	64
TROPICAL PRODUCTS—									
Sugar-cane, 24 stalks or 1 stool	30	3	6	2	15	16	..	2	20
Cotton, in seed	20	10	15	12	12	15	15	12	15
Coffee	5	..	..	..	3	5	..	..	3
Totals	55	13	21	14	30	36	15	14	38
TOBACCO—									
Tobacco, leaf, dried	10	8	5	9	8	5	..	4	6
HAY, CHAFF, ETC.—									
Hay—Oaten, wheaten, lucerne, and other varieties	20	13	9	9	15	6	11	8	17
Grasses and their seeds, including canary	10	4	5	7	7	6	6	1	7
Chaff—Oaten, wheaten, lucerne, and other varieties	20	20	13	4	15	7	14	10	18
Ensilage, any form	15	7	6	3	6	6	4	2	15
Cattle fodder (pumpkins and green fodder)	15	14	8	10	9	6	10	7	10
Sorghum and millet (in stalk)	10	9	10	6	6	4	5	4	7
Broom millet, 10 lb.	10	6	7	8	8	6	2	8	10
Cowpea, seed, 7 lb.	7	6	6	3	7	3	3	3	5
Flax, 3 lb., and hemp, 3 lb.	5	4	2	4	4	4	..	3	4
Totals	112	83	66	54	77	48	55	46	93
WOOL—									
Greasy, 3 fleeces	20	16	15	18	18	17	15	20	17
Mohair	5	4	5	3	..	4	3	4	4
Totals	25	20	20	21	18	21	18	24	21
DRINKS, ETC.—									
Temperance drinks, 6 bots.	10	7	6½	5	7	7	4½	6½	7
WOMEN'S AND CHILDREN'S WORK—									
Needlework and knitting	10	5	4	6	7	9	3	9	5
Fine arts	5	2	..	3	1	4	2	1	1
Fancy work	15	6	7	3	8	10	4	11	8
School work, maps, writing, &c.	5	4	4	3	..	2	4	2	2
School needlework	5	1	2	1	..	4	3	..	4
Totals	40	18	17	16	16	29	16	23	20

ONE-MAN FARM—*continued.*

	Possible Points.	H. Franke.	E. J. Rossow.	W. D. Ponton.	L. D. Christensen.	J. T. Whiteway.	J. Donges.	W. Brumpton.	J. Beck.
MISCELLANEOUS—									
Articles of commercial value	5	5	5	5	4	5	3	4	5
PLANTS AND FLOWERS IN POTS	5	5	2	4	..	5	4	3	..
TIME AND LABOUR-SAVING USEFUL ARTICLES—									
Made on the farm ..	10	7	6	..	9	9	8	9	..
EFFECTIVE ARRANGEMENT OF EXHIBITS—									
Comprehensiveness of view	10	9	6½	8	9	6½	8½	7½	9
Arrangement of stands ..	10	10	7	9½	8	7½	6½	7	9
Effective ticketing ..	5	4	3	4½	3½	4	3	2½	4½
General finish	15	14½	11	14½	13½	11½	9	10½	13
Totals	40	37½	27½	36½	34	29½	27	27½	35½
Grand Totals ..	661	473	387	413	432½	424	307½	352	445½

TROPICAL PRODUCTS.

NORTH QUEENSLAND'S FINE EXHIBIT.

Although there was only one exhibit in the Tropical Products District competition, that of North Queensland, this was awarded a very high percentage of points, and is one of the interesting features of the District Exhibit Section. Details:—

	Possible Points.	Northern Queensland.
DAIRY PRODUCE—		
Butter, 1 box, 56 lb.	90	82
Milk (in any form), cream	10	..
Cheese, 1 cwt.	60	50
Eggs (suitable for domestic use)	20	14
Totals	180	146
FOODS—		
Hams, bacon, rolled and smoked beef and mutton ..	50	42
Smallgoods and sausages	5	3
Canned meats	25	22
Fish—smoked, preserved, or canned	10	8
Lard, tallow, and animal oils	20	15
All butchers' by-products	10	5
Honey and by-products thereof	20	12
Confectionery	10	3
Biscuits, bread, cakes, and scones	10	6
Totals	160	116

TROPICAL PRODUCTS—*continued.*

	Possible Points.	Northern Queensland.
Fruit, Vegetables, and Roots—		
Fresh and preserved, fresh fruits, all kinds	60	52
Preserved fruits, jams, jellies	20	16
Crystallised and dried fruits	20	14
Fresh vegetables, all kinds, including table pumpkins, but excluding potatoes	25	15
Preserved and dried vegetables, pickles, and sauces	10	8
Potatoes, English and sweet	40	34
Roots, all kinds, and their products, including meals, arrowroot, cassava, &c.	14	9
Cocoanuts, peanuts, and other nuts	10	7
Vegetable seeds	10	..
Totals	209	155
Grain—		
Maize, in cob	25	15
Maize, shelled	25	16
Rice and other cereals and their meals	15	10
Totals	65	41
Minerals and Building Materials—		
Gold, silver, copper, and precious stones	25	14
Coal, iron, and other minerals, and salt	30	14
Stone, bricks, cement, marble, terra-cotta	20	12
Woods, dressed, undressed, and polished	25	24
Totals	100	64
Tropical Products—		
Sugar-cane	60	56
Sugar, raw and refined)	20	14
Rum, other spirits and by-products	10	5
Coffee (raw and manufactured), tea, spices, and essences	10	8
Cotton (raw) and by-products	30	15
Rubber	10	8
Oils (medical and machinery)	15	..
Tropical products, not elsewhere enumerated	15	..
Totals	170	106
Wines, Etc.—		
Wines	15	4
Vinegar, cordials, aerated, and mineral spa waters	10	7
Ales and stout	10	8
Totals	35	19
Tobacco, Etc.—		
Tobacco (raw)	20	15
Cigars, cigarettes, and snuff	10	..
Totals	30	15

TROPICAL PRODUCTS—*continued.*

	Possible Points.	Northern Queensland.
HAY, CHAFF, ETC.—		
Hay—Oaten, wheaten, lucerne, other varieties	30	18
Grasses and their seeds	10	6
Chaff—Oaten, wheaten, lucerne, and other varieties	50	20
Ensilage and other prepared cattle fodder	20	10
Sorghums and millets, in stalk	10	7
Commercial fibres, hemp, and flax	15	2
Pumpkins and other green fodder	10	6
Broom millet, ready for manufacture	10	4
Farm seeds, including canary seed	12	7
Totals	168	80
WOOL, ETC.—		
Scoured wool	40	38
Greasy wool	60	59
Mohair	10	8
Totals	110	105
MISCELLANEOUS PRODUCTS OF COMMERCIAL VALUE—		
Wattle bark	15	12
Preserved skins	15	10
Marine shells	15	15
Tropical plants and foliage	10	5
Total	55	42
LADIES' AND SCHOOLS' WORK AND FINE ARTS—		
Needlework and knitting	25	20
Essay by pupil of school in district on "Value of Agriculture and Dairying"; to be judged for writing and composition	10	9
Fine arts	5	2
School work, maps, writing, &c., by pupils of school in district	5	5
School needlework by pupils of schools in district	5	1
Totals	50	37
ENLARGED PHOTOGRAPHS	5	3
EFFECTIVE ARRANGEMENT—		
Comprehensiveness of view	20	18
Arrangement of sectional stands	25	18
Effective ticketing	10	6
General finish	25	16
Totals	80	58
Grand Totals	1,417	987

BUTTER AND CHEESE CONTESTS.

BUTTER FOR EXPORT.

Once again Oakey achieved a striking performance in the butter section. Of four classes of butter for export judged the Oakey Association was successful in three, thus adding more honours to their long list of previous successes in Brisbane and other capitals. Oakey was first in export butter, thirty days' storage, salted, with 95½ points; first in export butter, eight weeks' storage, salted, with similar points; and in export butter, eight weeks' storage, unsalted, they were again successful with 96 points. In export butter, eight weeks' storage, the Maryborough Company's Kingaroy factory was first with 95½ points, beating the Oakey factory by half a point only. Details:—

Thirty Days' Storage, Salted.

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish	Total.
Possible points	65	27	7	4	4	100
Oakey Creek District Co-operative Dairy Association, Ltd.	60½	20	7	4	4	95½
Southern Queensland Dairy Co., Ltd. ..	60	20	7	4	4	95
Caboolture Co-operative Dairy Association, Ltd., Eumundi	59½	20	7	4	4	94½
Warwick Co-operative Dairy Association, Ltd., Allora	59	20	7	4	4	94
Wide Bay Co-operative Dairy Association, Ltd., Gympie	58½	20	7	4	4	93½
Caboolture Co-operative Dairy Association, Ltd., Pomona	59	19½	7	4	4	93½
Downs Co-operative Dairy Association, Ltd., Goombungee	59	20	6½	4	4	93½
Maleny Co-operative Dairy Association, Ltd., ...	58½	20	7	4	4	93½
Dayboro' Co-operative Dairy Association, Ltd.	59	19½	6½	4	4	93
Downs Co-operative Dairy Association, Ltd., Miles	58	20	7	4	4	93
Downs Co-operative Dairy Association, Ltd., Toowoomba	58	20	7	4	4	93
Maryborough Co-operative Dairy Association, Ltd., Kingaroy	58	20	7	4	4	93
Warwick Co-operative Dairy Association, Ltd., Mill Hill	58½	19½	7	4	4	93
Caboolture Co-operative Dairy Association, Ltd., Caboolture	58	19½	7	4	4	92½
Gayndah Co-operative Dairy Association, Ltd.	58	19½	7	4	4	92½
Queensland Farmers' Co-operative Dairy Association, Ltd., Grantham	58	19½	7	4	4	92½
Queensland Farmers' Co-operative Association, Ltd., Laidley	58	20	7	3½	4	92½
Maryborough Co-operative Dairy Association, Ltd., Mundubbera	57	20	7	4	4	92
Maryborough Co-operative Dairy Association, Ltd., Maryborough	57	19½	7	4	4	91½
Wide Bay Co-operative Dairy Association, Ltd., Wide Bay	57	19½	7	4	4	91½
Downs Co-operative Dairy Co., Ltd., Clifton	57	19½	7	4	4	91½
Kin Kin Co-operative Dairy Association, Ltd.	57	19½	7	4	4	91½
Queensland Farmers' Co-operative Association, Ltd., Booval	56½	19½	7	4	4	91

BUTTER FOR EXPORT—*continued.*

Thirty Days' Storage, Salted—*continued.*

	Flavour	Texture.	Colour.	Salting.	Packing and Finish	Total.
Possible points	65	20	7	4	4	100
Logan and Albert Co-operative Dairy Association, Ltd.	57	19½	6½	3½	4	90½
Downs Co-operative Dairy Association, Ltd., Crow's Nest	55	20	6½	4	4	89½
Queensland Farmers' Association, Ltd., Boonah	55	19½	7	4	4	89½
Chinchilla Co-operative Dairy Association, Ltd.	55	19½	7	4	3½	89
Maryborough Co-operative Dairy Association, Ltd., Biggenden	55	19	6½	4	4	88½

Eight weeks' storage, unsalted.

Maryborough Co-operative Dairy Association, Ltd., Kingaroy	60½	20	7	4	4	95½
Oakey District Co-operative Butter Association, Ltd.	60	20	7	4	4	95
Wide Bay Co-operative Dairy Association, Ltd., Gympie	59½	20	7	4	4	94½
Downs Co-operative Dairy Association, Ltd., Miles	58½	20	7	4	4	93½
Downs Co-operative Dairy Association, Ltd., Toowoomba	58	20	7	4	4	93
Queensland Farmers' Co-operative Association, Ltd., Boonah	58	20	7	4	4	93
Warwick Co-operative Dairy Association, Ltd., Mill Hill	58	20	7	4	4	93
Port Curtis Co-operative Dairy Association, Ltd.	58	19½	7	4	4	92½
Caboolture Co-operative Dairy Association, Ltd., Pomona	57	20	7	4	4	92
Downs Co-operative Dairy Association, Ltd., Clifton	57	20	7	4	4	92
Downs Co-operative Dairy Association, Ltd., Goombungee	57	20	7	4	4	92
Gayndah Co-operative Dairy Association, Ltd.	57	20	7	4	4	92
Queensland Farmers' Co-operative Association, Ltd., Booval	57	20	7	4	4	92
Queensland Farmers' Co-operative Association, Ltd., Grantham	57	20	7	4	4	92
Queensland Farmers' Co-operative Association, Ltd., Laidley	57	20	7	3½	4	91½
Warwick Co-operative Dairy Association, Ltd., Allora	57	19½	7	4	4	91½
Caboolture Co-operative Dairy Association, Ltd., Caboolture	57	19½	7	4	4	91½
Caboolture Co-operative Dairy Association, Ltd., Eumundi	56½	20	7	4	4	91½
Maryborough Co-operative Dairy Association, Ltd., Biggenden	57	20	6½	4	4	91½
Maryborough Co-operative Dairy Association, Ltd., Maryborough	57	19½	7	4	4	91½
Maleny Co-operative Dairy Association, Ltd., ...	56	19½	7	4	4	90½
Wide Bay Co-operative Dairy Association, Ltd., Cooroy	56½	19½	6½	4	4	90½

BUTTER FOR EXPORT—*continued.*

Eight Weeks' Storage, Unsalted—*continued.*

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish.	Total.
Possible points	65	20	7	4	4	100
Chinchilla Co-operative Dairy Association, Ltd.	56	19½	6½	4	4	90
Dayboro' Co-operative Dairy Association, Ltd.	56	19½	6½	4	4	90
Southern Queensland Dairy Co., Ltd. ..	55	19½	6½	4	4	89
Kin Kin Co-operative Dairy Association, Ltd.	55	19	6½	4	3½	88
Logan and Albert Co-operative Dairy Association, Ltd.	54	19½	6½	4	4	88
Downs Co-operative Dairy Association, Ltd., Dalby	52	20	7	4	4	87
Downs Co-operative Dairy Association, Ltd., Crow's Nest	52	19½	6½	4	4	86
Maryborough Co-operative Dairy Association, Ltd., Mundubbera	52	19½	6½	4	4	86

Eight weeks' storage, salted, manufactured in Queensland (from pasteurised cream), suitable for table use in Britain.

Oakey District Co-operative Butter Association, Ltd.	61	20	7	4	4	96
Maryborough Co-operative Dairy Association, Ltd., Kingaroy	60	20	7	4	4	95
Wide Bay Co-operative Dairy Association, Ltd., Gympie	59½	20	7	4	4	94½
Downs Co-operative Dairy Association, Ltd., Miles	59	20	7	4	4	94
Caboolture Co-operative Dairy Association, Ltd., Eumundi	58⅓	20	7	4	4	93½
Downs Co-operative Dairy Association, Ltd., Toowoomba	58½	20	6½	4	4	93
Queensland Farmers' Co-operative Association, Ltd., Grantham	58	20	7	4	4	93
Kin Kin Co-operative Dairy Association, Ltd.	58	19½	7	4	4	92½
Downs Co-operative Dairy Association, Ltd., Goombungee	57	20	7	4	4	92
Maryborough Co-operative Dairy Association, Ltd., Maryborough	57	20	7	4	4	92
Port Curtis Co-operative Dairy Association, Ltd.	57	20	7	4	4	92
Warwick Co-operative Dairy Association, Ltd., Mill Hill	57	20	7	4	4	92
Downs Co-operative Dairy Association, Ltd., Dalby	56½	20	7	4	4	91½
Maryborough Co-operative Dairy Association, Mundubbera	57	19½	7	4	4	91½
Warwick Co-operative Dairy Association, Ltd., Allora	57½	19½	6½	4	4	91½
Queensland Farmers' Co-operative Association, Ltd., Booval	56½	19½	7	4	4	91
Chinchilla Co-operative Dairy Association, Ltd.	57	19½	6½	4	4	91
Downs Co-operative Dairy Association, Ltd., Clifton	56½	19½	7	4	4	91
Maleny Co-operative Dairy Association, Ltd.	57	19½	6½	4	4	91

BUTTER FOR EXPORT—*continued.*

Eight weeks' storage, salted, manufactured in Queensland (from pasteurised cream), suitable for table use in Britain—*continued.*

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish.	Total.
Possible points	65	20	7	4	4	100
Maryborough Co-operative Dairy Association, Ltd., Biggenden	56½	19½	6½	4	4	90½
Caboolture Co-operative Dairy Association, Ltd., Pomona	56	19½	6½	4	4	90
Downs Co-operative Dairy Association, Ltd., Crow's Nest	54	20	7	4	4	89
Logan and Albert Co-operative Dairy Association, Ltd.	55	19½	6½	4	4	89
Wide Bay Co-operative Dairy Association, Ltd., Cooroy	55	19½	6½	4	4	89
Gayndah Co-operative Dairy Association, Ltd.	54	19½	7	4	4	88½
Caboolture Co-operative Dairy Association, Ltd., Caboolture	55	19	6	4	4	88
Queensland Farmers' Co-operative Association, Ltd., Boonah	53	20	7	4	4	88
Queensland Farmers' Co-operative Association, Ltd., Laidley	54	19½	7	3½	4	88
Southern Queensland Dairy Co., Ltd.	54	19½	6½	3½	4	87½
Dayboro' Co-operative Dairy Association, Ltd.	55	19	4	4	4	86

Eight weeks' storage, salted, no preservatives other than salt.

Oakey District Co-operative Butter Association, Ltd.	60½	20	7	4	4	95½
Maryborough Co-operative Dairy Association, Ltd., Kingaroy	60	20	7	4	4	95
Wide Bay Co-operative Dairy Association, Ltd., Gympie	59½	20	7	4	4	94½
Caboolture Co-operative Dairy Association, Ltd., Eumundi	58½	20	7	4	4	93½
Downs Co-operative Dairy Association, Ltd., Goombungee	58½	20	6½	4	4	93
Queensland Farmers' Co-operative Association, Ltd., Boonah	58	20	7	4	4	93
Port Curtis Co-operative Dairy Association, Ltd.	58	20	7	4	4	93
Warwick Co-operative Dairy Association, Ltd., Mill Hill	58	20	6½	4	4	92½
Queensland Farmers' Co-operative Association, Ltd., Laidley	57½	19½	7	4	4	92
Downs Co-operative Ltd., Dalby	57	19½	7	4	4	91½
Kin Kin Co-operative Dairy Association, Ltd.	57	19½	7	4	4	91½
Wide Bay Co-operative Dairy Association, Ltd., Cooroy	57	19½	7	4	4	91½
Maryborough Co-operative Dairy Association, Ltd., Biggenden	57	19½	6½	4	4	91
Queensland Farmers' Co-operative Association, Ltd., Booval	57	19½	6½	4	4	91
Warwick Co-operative Dairy Association, Ltd., Allora	56	19½	6½	4	4	90
Caboolture Co-operative Dairy Association, Ltd., Caboolture	56½	19	6½	4	4	90
Gayndah Co-operative Dairy Association, Ltd.	55	19½	7	4	4	89½

BUTTER FOR EXPORT—*continued.*

Eight weeks' storage, salted, no preservatives other than salt—*continued.*

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish.	Total.
Possible points	65	20	7	4	4	100
Maryborough Co-operative Dairy Association, Ltd., Mundubbera	55	19½	7	4	4	89½
Caboolture Co-operative Dairy Association, Ltd., Pomona	56	19	6½	4	3½	89
Maleny Co-operative Dairy Association, Ltd.	55	19½	6½	4	4	91
Maryborough Co-operative Butter Association, Ltd., Maryborough	55	19½	6½	4	4	89
Queensland Farmers' Co-operative Association, Ltd., Grantham	55	19½	6½	4	4	89
Chinchilla Co-operative Dairy Association, Ltd.	54	19½	6½	4	4	88
Downs Co-operative Dairy Association, Ltd., Clifton	55	19½	6½	4	4	89
Southern Queensland Dairy Co., Ltd. ..	54	19½	6½	4	4	88
Downs Co-operative Dairy Association, Ltd., Crow's Nest	53	19½	6½	4	4	87

CHEESE FOR EXPORT.

A remarkable sequence of successes was scored by the Pittsworth Dairy Company, Limited, in the cheese section of the dairy produce contests. Its "P" factory won the competiton for export cheese, white, with the very high points of 96½ out of a possible 100. The company also filled second and third places in this class. In the export cheese, coloured class, the company's "P" factory was again successful with 95¾ points, and in the medium cheese class, over two months old, exceeding 40 lb., the same factory was placed first with 95½ points. The company registered its fourth successive win in the class, medium cheese, under six weeks old, not exceeding 40 lb., with 94½ points. Details:—

Export, white, suitable for English market; two, each 70 lb. to 80 lb.; six weeks' storage.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., "P" Factory	46½	25	15	10	96½
Pittsworth Dairy Co., Ltd., "Y" Factory ..	46	25	14¾	9¾	95½
Pittsworth Dairy Co., Ltd., "T" Factory ..	45½	25	15	9¾	95¼
Downs Co-operative Dairy, Ltd., Lilyvale ..	45	24¼	15	10	94¼
Downs Co-operative Dairy, Ltd., Boodua ..	44	25	15	10	94
Downs Co-operative Dairy, Ltd., Westbrook ..	45	25	14½	9½	94
Yargullen Co-operative Dairy, Ltd.	44	24½	15	9¾	93¼
Downs Co-operative Dairy, Ltd., Koondai ..	43	25	14¾	9¾	92½
Southbrook Co-operative Dairy Co., Ltd. ..	43	25	15	9½	92½
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	43	25	15	9¼	92¼
Pittsworth Dairy Co., Ltd., "E" Factory ..	42	25	15	9½	91½
Biddeston Co-operative Dairy, Ltd.	42	24½	15	9½	91
Oakey District Co-operative Butter Association, Ltd., Kelvinhaugh	39	25	15	9½	88½

CHEESE FOR EXPORT—*continued.*

Export, coloured, suitable for English market; two, each 70 lb. to 80 lb.; six weeks' storage.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., "P" Factory ..	46	25	14¾	10	95¾
Irongate Co-operative Dairy Association, Ltd. ..	45½	24¾	14¾	9	94
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44½	25	14¾	9½	93½
Downs Co-operative Dairy Co., Ltd., Westbrook ..	43	25	15	9¾	92¾
Yargullen Co-operative Dairy Association, Ltd. ..	44	24½	14¾	9½	92¾
Downs Co-operative Dairy Association, Ltd., Koondai	43	24¾	15	9¾	92½
Downs Co-operative Dairy Association, Ltd., Lilyvale	43	24½	15	9¾	92½
Pittsworth Dairy Factory, Ltd., "T" Factory ..	43	25	15	9½	92½
Southbrook Co-operative Dairy Co., Ltd.	43	25	15	9½	92½
Pittsworth Dairy Factory, Ltd., "E" Factory ..	43	24½	15	9½	92
Warwick Co-operative Dairy Association, Ltd., Bony Mountain	43	24½	14½	9½	91½
Warwick Co-operative Dairy Association, Ltd., Greymare	43	24½	14½	9½	91½
Oakey District Butter Association, Ltd., Kelvinhaugh	42	24½	15	9½	91
Pittsworth Dairy Co., Ltd., "Y" Factory ..	42	24½	14½	10	91
Biddeston Co-operative Dairy Association, Ltd. ..	41½	25	14¾	9¾	91
Malling Co-operative Dairy Association, Ltd. ..	42	24½	15	9½	91
Oakey District Co-operative Butter Association, Ltd., Crosshill	42	24¾	14¾	9¼	90¾

Medium cheese, over 2 months' old; two, each not exceeding 40lb.

Pittsworth Dairy Co., Ltd., "P" Factory ..	45½	25	15	10	95½
Irongate Co-operative Dairy Association, Ltd. ..	44	25	14¾	9½	93¼
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44	24½	14¾	9½	92¾
Oakey District Co-operative Butter Association, Ltd., Crosshill ..	42½	25	15	9	91½
Southbrook Co-operative Dairy Co., Ltd. ..	42	24¾	15	9¾	91½
Malling Co-operative Dairy Association, Ltd. ..	42½	24½	14¾	9½	91¼
Downs Co-operative Dairy Association, Ltd., Westbrook	42	24½	14½	9¾	90¾
Downs Co-operative Dairy Association, Ltd., Koondai	42	24½	14¾	9¼	90¾
Pittsworth Dairy Co., Ltd., "Y" Factory ..	42½	24¾	14	9½	90¾
Downs Co-operative Dairy Association, Ltd., Lilyvale	41	24¾	14½	10	90¼
Oakey District Co-operative Butter Association, Ltd., Kelvinhaugh	41	24¾	15	9½	90¼
Downs Co-operative Dairy Association, Ltd., Boodua	41	24½	14½	9¾	89¾
Sunnyvale Co-operative Cheese Association ..	40	24½	14½	9¾	88¾
Pittsworth Dairy Co., Ltd., "E" Factory	39	24½	15	10	88½
Coalstoun Lakes Co-operative Dairy Association, Ltd.	40	24½	14	9½	88
Yargullen Co-operative Dairy Association, Ltd. ..	39	25	15	9	88
Warwick Co-operative Dairy Association, Ltd., Greymare	40	24	14	7	85

CHEESE FOR EXPORT—*continued.*

Medium Cheese, under 6 weeks' old; two, each not exceeding 40 lb.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Pittsworth Dairy Co., Ltd., "P" Factory ..	45	24¾	14¾	10	94½
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44½	24¾	15	9½	93¾
Biddeston Co-operative Dairy Association, Ltd. ..	44	25	14¾	9¾	93½
Downs Co-operative Dairy Association, Ltd., Westbrook	43	25	15	9¾	92¾
Downs Co-operative Dairy Association, Ltd., Koondai	43	25	15	9½	92½
Oakey District Co-operative Butter Association, Ltd., Crosshill	43	24¾	14¾	9¼	91¾
Pittsworth Dairy Co., Ltd., "Y" Factory ..	43	24½	14¾	9½	91¾
Downs Co-operative Dairy Association, Ltd., Lilyvale	42	25	15	9½	91½
Yargullen Co-operative Dairy Association, Ltd. ..	43½	24½	14½	9	91½
Southbrook Dairy Co., Ltd.	42	24½	15	9¾	91¼
Oakey District Co-operative Butter Association, Ltd., Kelvinhaugh	42	24½	14½	9¾	90¾
Greenmount Dairy Co., Ltd.	42	24½	14½	9½	90½
Malling Co-operative Dairy Association, Ltd. ..	41	25	15	9½	90½
Pittsworth Dairy Co., Ltd., "E" Factory ..	41	25	15	9½	90½
Downs Co-operative Dairy Association, Ltd., Boodua	41	24½	14	9½	89
Pittsworth Dairy Co. Ltd. "D" Factory ..	40	24½	14½	8	87
Irongate Co-operative Dairy Association, Ltd. ..	39	24	14½	9	86½
Sunnyvale Co-operative Cheese Association ..	37	24	14	9½	84½
Coalstoun Lakes Co-operative Dairy Association, Ltd.	37	24	14	9	84
Warwick Co-operative Dairy Association, Ltd., Greymare	38	24	14	8	84

CARE OF THE FARM TEAM.

In a paper on this subject, at a recent farmers' meeting in South Australia, a local farmer, Mr. A. Cornish, said when buying or breeding horses an endeavour should be made to get an even team both in size and pace. It was advisable to breed two or three foals every year to keep up the strength of the team. Horses should always be watered before feeding, otherwise the food would not be digested. One should keep a regular time for feeding and watering the horses, and if possible they should be watered three times a day, especially during harvest. The water trough should be as close to the stables as possible, but not in the yard, because the horses would pick up a mouthful of hay and drop it across the yard as they went for a drink, and also drop chaff in the water. The horses should be stable-fed during seeding. He would feed with chaff for breakfast and dinner, and for tea as much hay as they would clean up with the last feed of chaff. The horses would do better if given bran or oats with their chaff. They should be tied up for feeding; that allowed each animal to have a fair share of the food. The horses should be groomed every morning, before harnessing. If one could not spare the time for that, at least the shoulders should be brushed to remove sweat. Grooming was also a preventive of sore shoulders. The harness should be made to fit properly; the collar should be fairly tight. Ninety per cent. of sore shoulders was caused through loose and ill-fitting collars. If backbands were used they held the collar up, and so helped to prevent sore shoulders; they also had a tendency to keep the team from tossing their heads. When using ten or more horses, the team should be worked in tandem to do away with a number of swings, and keep the horses in front of the implement. Horses should never be worked after sunset, especially during the winter months, because there was no evaporation, and their shoulders were more inclined to scald. The stables should be cleaned out regularly.

THE TREND TOWARD ECONOMY IS INCREASING THE DEMAND
THE TREND TOWARD ECONOMY IS INCREASING THE DEMAND FOR CUTS OF BEEF FROM LIGHTER CATTLE
GENERALLY SPEAKING THE HEAVY AGED BULLOCK IS NO LONGER

PLATE 85.—FOOD FOR THE MILLION—PART OF THE GREAT SHOW IN THE MEAT HALL.

THE MEAT INDUSTRY.

THE POSITION REVIEWED.

ECONOMICS OF MEAT PRODUCTION—THE NEED OF EFFECTIVE ORGANISATION—A NATIONAL ADVISORY BOARD SUGGESTED—NO NEED FOR PESSIMISM—QUEENSLAND THE CATTLE STATE OF THE COMMONWEALTH—"QUEENSLAND'S BEST EQUAL TO THE BEST OF ANY OTHER COUNTRY."

The general economics of the live stock and meat industry were reviewed by the Acting Premier, Mr. W. Forgan Smith, and a number of leaders in the cattle world on the occasion of the official opening of the Meat Hall at the Brisbane Exhibition on 8th August.

Mr. E. F. Sunners, Honorary Council Steward of the Royal National Association, read a very informative paper on the "Economics of Meat Production," in the course of which he suggested the creation of a national advisory board to control the meat industry of the Commonwealth.

The necessity for organising the meat industry was stressed strongly by Mr. Forgan Smith and others, and the general consensus of the gathering was that, by effective organisation, Australia would be in a position to take her proper place as one of the biggest producing countries of the world, and remain for all time the main supplier to the markets of Great Britain.

A report of the proceedings, including the text of Mr. Sunners's valuable paper, is presented in the following pages, and will no doubt be read with interest by all concerned in the stability and advancement of our pastoral industry.—Ed.

The Live Stock and Meat Industry Hall was officially opened by the Acting Premier (Mr. W. Forgan Smith) at the Show Ground on 8th August.

Mr. Ernest Baynes (president of the Royal National Agricultural and Industrial Association) explained that the idea of a meat industry exhibit originated from the Metropolitan Meat Industry Board of New South Wales, which had a somewhat similar, but not nearly so comprehensive, display at the last Royal Show in Sydney. He thanked the Queensland Government for its financial assistance, the Metropolitan Meat Industry Board of New South Wales for allowing Mr. W. H. Paine to come over and help them with the exhibits, Mr. Robert Joyce for the loan of the Lightfoot (Linde) refrigerating plant, Mr. Richard Gailey, the architect, and Mr. E. F. Sunners, the "guiding force" of the exhibit.

The Importance of the Pastoral Industry.

The Acting Premier (Mr. W. Forgan Smith), in officially opening the hall, said the Royal National Association was to be congratulated heartily on its enterprise and public-spiritedness. One realised, on going around the pavilion, how important the meat industry was to Queensland, and how interdependent the various industries were on the primary industry. "The cattle industry is not in a good position at the present time, nor has it been since the great slump in prices that followed the Great War," said Mr. Smith. "The men who are engaged in this industry have been carrying on under very great difficulties, and it is necessary for an exhibit of this kind to bring home to the people exactly what the industry means to them. There is no need for pessimism, however. There is no need to get our tails down and cry out in despair. Queensland is a great cattle-producing State. We should take stock of the facts of the situation, realise the problems involved, and apply our minds to the solution of them. What other countries have done, we can do."

PLATE 86. PIG PRODUCTS DISPLAY IN THE MEAT HALL.

"Queensland's Best Equal to the Best of any other Country."

Mr. Smith went on to say that the industry needed organisation in all its branches—production, treatment, and distribution of the product. It must meet organisation by organisation, efficiency by equal efficiency, at the very least. It was only along those lines that improvement could be effected. "Queensland's best is equal to the best of any State or of any other country. Nothing but the best is good enough for Queensland," be declared amidst sustained applause. He wished the association every success in the worthy enterprise it had launched. It gave him the greatest pleasure to declare the fine hall and the exhibition contained therein open.

Mr. W. J. Affleck (chairman of the council of the Royal National Agricultural and Industrial Association of Queensland) said: "We are in the business for the benefit of Queensland. Our hearts are in it." The meat industry exhibits would be an eye-opener, not only to sheep and cattle men, but to all citizens who visited the Show. This section, like all the others in the Show, had been organised for the benefit of the State. The new hall had cost nearly £3,000.

THE ECONOMICS OF MEAT PRODUCTION.

A NATIONAL ADVISORY BOARD SUGGESTED.

Mr. E. F. Sunners (Honorary Council Steward of the Royal National Agricultural and Industrial Association) read an informative paper on the economics of the industry, and suggested the setting up of a national advisory board. Following is the text of his useful contribution to current discussion on the position of the pastoral business:—

Attention is being called daily to the very critical condition of the live stock and meat industry of Australia, the beef cattle industry in particular, said Mr. Sunners. The production of beef cattle is carried on more extensively in Queensland than in any other State of the Commonwealth, the percentage of the cattle herd in the respective States as at the end of 1925 being about as follows:—Queensland, 49.52; New South Wales, 22.08; Victoria, 11.62; South Australia, 2.86; Western Australia, 5.81; Northern Territory, 6.56; Tasmania, 1.65. Of the cattle in the Northern Territory, probably 40 per cent. of the yield finds its way into Queensland, and, to some extent, South Australia. The balance of the Northern Territory yield seems to be disposed of by way of export as live cattle from Port Darwin or treated through the Wyndham works. This review particularly deals with conditions applying to 40 per cent. of the herd of the Northern Territory, as well as the herds of Queensland, New South Wales, Victoria, and South Australia; or, in other words, the herd of the eastern side of Australia, which equals about 87 per cent. of the total Commonwealth herd. It specifically covers the condition of the industry in Queensland, as this State has about 57 per cent. of the herd of the eastern side of Australia, and, to a large extent, is the key to the beef supply of this portion of the Commonwealth.

Outstanding Features.

The main outstanding features of the industry are as follows:—(1) The producer sees little or no encouragement toward the production of cattle, particularly of good quality. (2) There is undoubtedly room for some better form of industrial organisation in respect to the domestic trade, particularly as the domestic consumption of the Eastern States of Australia absorbs 80 per cent. of the production, and is regularly expanding. (3) The export trade is now conducted under conditions which are unfavourable towards the successful functioning of this division of the industrial organisation, and prohibitive in competition with other beef exporting countries. (4) The movement of live cattle from Queensland to other States is extensive, and, to some extent, this manner of distribution could be improved upon with advantage to the producers of Queensland and consumers of Southern States. It would seem that a proper solution of these main features is fundamental to the welfare and prosperity of the industry, and, therefore, the existing conditions under each of these headings calls for close scrutiny.

The Producer's Problem.

The average approximate export price paid in Queensland for bullocks for the years 1912 to 1927 (per 100 lb. delivered weight) was shown on a chart. The Southern Queensland price, on the average, now appears to be only slightly higher than in 1913, possibly 10 per cent. to 15 per cent., but the Northern price to-day is actually less than it was in 1913, approximately 10 per cent., Mr. Sunners continued. The cost of droving and railage has increased considerably, so that the producer's problem is the making of less than pre-war returns to cover post-war expenditure.

PLATE 87.—STRIKING PANELS IN THE MEAT HALL.
What Scientific and Industrial Research means to the Rural Producer.

Prices have been on the low level since 1921, and the general condition and quality of the herd is undoubtedly reflecting the low value of cattle. Had Queensland's production of beef been sufficient for domestic requirements only, the cost of beef to the consumer, no doubt, would have been on a higher price level than it has been during the past few years. The available supply, however, has been in excess of the domestic demand, and for the years 1920 to 1925 the average yearly surplus, over and above domestic and interstate requirements, has amounted to about 300,000 cattle, equal to 36 per cent. of the total production. This surplus influences the value of the total production, for the reason that, if the exportable parity is on a low level, then in effect, the total yield is first available for domestic consumption, until the over-supply bears the domestic price down to the price at which the exporters can afford to purchase. For the time being, at least, the oversea value seems to have reached and settled on a low price level, being influenced in this direction by the diminished purchasing power of the people of Great Britain and the Continent; also by the fact that the industry of the Argentine and Uruguay appears to be able to meet such a situation, as the supply of beef from these countries has been well maintained. In regard to the disposition of the total Queensland production, domestic requirements have absorbed about 34 per cent., interstate 30 per cent., leaving a surplus of the production for export amounting to 36 per cent.

Higher Production Costs.

It was to be expected that the cost of production, even under normal conditions, would show an upward tendency, but with industry properly organised, and functioning along sound lines, it no doubt would respond to this tendency, and maintain a balance between production and consumption. It is not to be expected, however, that in so short a period industry could respond to the accelerated cost of production of the past twelve years; firstly, due to the general effect of the war, and, secondly, to the particular effect of the protective policy of the Commonwealth. It is questionable, however, whether the industrial organisation connected with the meat industry has been able to offset even what might have been the normal increase in production cost, so that, with an export parity for the surplus which does not cover the increase, and with the domestic retail price level apparently fixed without regard to quality, or the real cost of production and marketing, it would appear quite understandable why the breeding and fattening of cattle cannot be otherwise than a discouraging business, and why the quality of the herd is deteriorating.

A Vital Industry.

The meat industry is a big vital industry. It should be regarded as one of the most important of the country, but there are economic principles connected with it that must be understood and recognised, not only by Governments, but also by the producer; and it is a further essential that the industrial organisation connected with it must be of such a character as to be able to function efficiently, and so organised as to be in a position to meet each successive demand in the changing conditions of national life. A close examination of the respective divisions of the industrial organisation should be made, to ascertain whether or not they are of this character. In respect to the slaughtering of live stock in Queensland for domestic requirements, it is found that this function is mainly performed by local butchers, whose business does not extend beyond supplying the demand for meat in their immediate vicinity. The domestic killing establishments are numerous, and the type of establishment does not permit of operations being conducted on a large scale, and, due to the absence of refrigeration and modern equipment, the full value of by-products cannot be obtained. As domestic requirements have expanded in this State, they have been met by a larger number of these small units, rather than by an expansion of the units themselves. Consequently there has been no progress in the direction of large scale utilisation of by-products, which is practicable only in large plants, being made possible by the use of refrigeration, and a volume of killing which justifies the installation of the necessary plant and equipment. Anything in the nature of the study of the arts and sciences connected with the meat industry appears to be entirely lacking, likewise any attention to more economic methods of merchandising. Although the domestic organisation of the State is responsible for the treatment of approximately one-third of the production, it would seem, in its present form, it cannot apply the necessary means to enable it to reduce the spread between producer and consumer. It would seem that some better type of organisation is long overdue wherever practicable—that is, in such cities and towns where the consumption is large enough to enable a modern type of plant to function. To some extent the Southern States have concentrated the domestic killing into larger units, but in these States, also, there is undoubtedly a necessity for an extension of the system before the domestic organisation can fulfil its requirements.

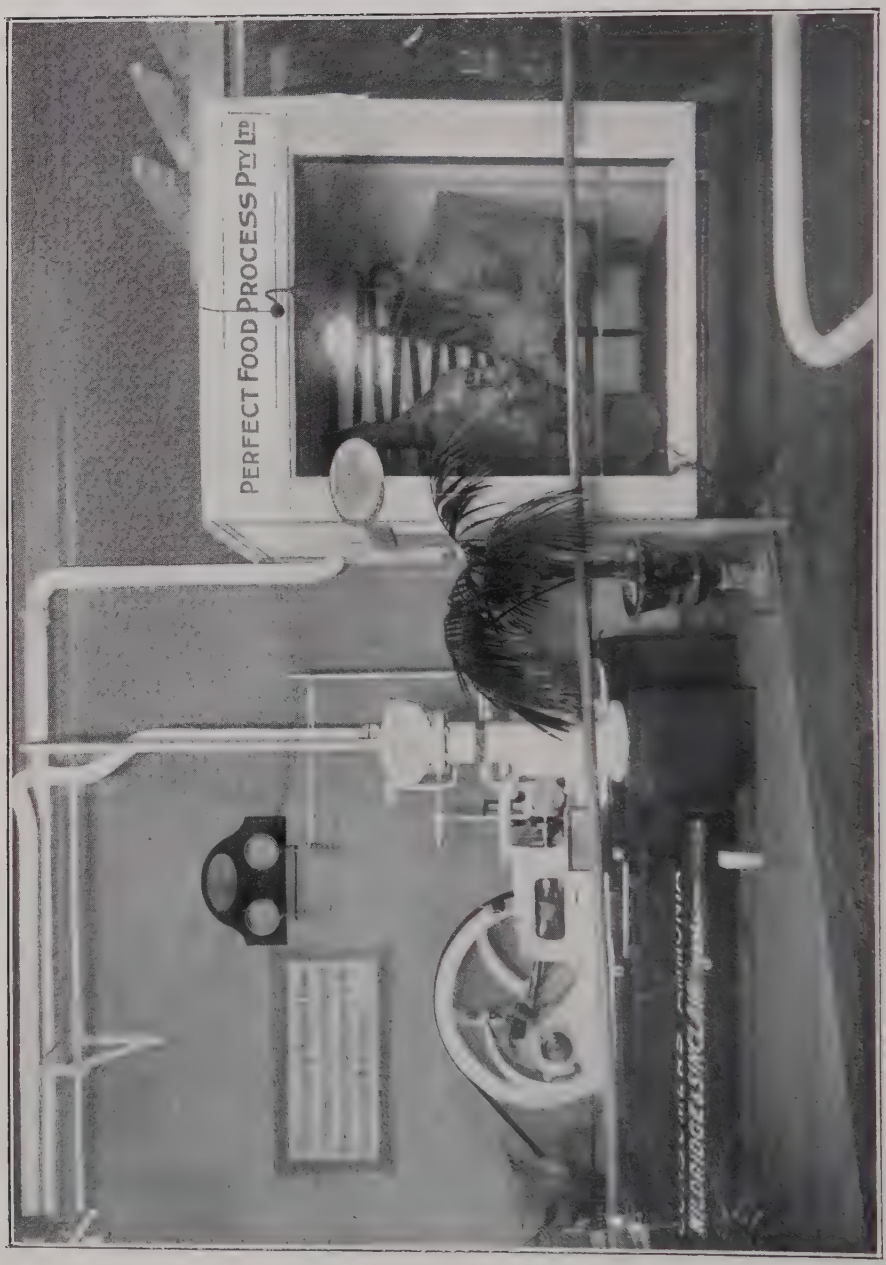


PLATE 88.—THE ENGINE-ROOM IN THE MEAT HALL.

The Industry's Competitive Capacity.

The export division consists of twelve plants, constructed at intervals from 1884 to 1914. The earlier type of construction differs materially from the modern plant design. The daily capacity of the respective works varies considerably. By reason of the Queensland export killing being concentrated into a short period of the year, a much larger capacity must be provided in proportion to annual volume than in the Argentine, where the killing extends throughout the year. In comparison to such a competitive country, where the working load is regular and economical, the Queensland plants, over an average of years, operated a little more than six months of the year, and during this short period used approximately but 56 per cent. of their combined capacity. Of course, the position of the individual plants varies, but the industry must be viewed from the aspect of its competitive capacity as a national unit. During the operating season the working load is very irregular, the full combined capacity being in use for possibly a month or two only. Mr. Sunners exhibited a chart showing the course of the maximum average and minimum load during the past twelve years. This method of working, he said, resulted in the operating period being saddled with the overhead expense of a very large idle period. He exhibited another chart illustrating the position as compared with an industry operating regularly, indicating that the overhead burden of the Queensland industry would be about three times greater per unit of product treated.

Export Organisation.

The average yearly tonnage of export meat products treated in the Argentine, Uruguay, and Australia for the years 1922 to 1926, inclusive, was shown on another chart, and he pointed out that the very large volume of business of the South American plants enabled them to secure lower operating costs in directions other than overhead. Another chart showed the monthly shipments of beef quarters from South America and Australia for 1926; but it was mentioned that it was unusual for Queensland to be shipping beef during the early months of the year. By the regular marketing of live stock the South American producers enable the exporters to operate their plants continuously, and furnish a steady flow of meat to the consuming markets, which has enabled the exporters to establish large selling organisations that can be depended upon to meet the daily needs of the people, Mr. Sunners said. There the respective branches of the industry are in harmony—production, manufacture, and distribution—so that, as an industrial organisation, it is both impressive and powerful. With them labour is permanently employed. In Queensland it is but casual, which does not promote satisfactory industrial relations. In comparison with the industry of South America, the exporters of this country have several outstanding disabilities, and it would appear that, without at least some partial solution of these root problems, the export industry must continue to languish. The stock returns as at the end of 1926 show a loss of 1,148,558 cattle, a little less than half the herd which yields the export surplus, indicating the exporters will suffer a heavy reduction in volume over the course of the next few years, further accentuating the disadvantage of this country. If the export business is to continue, the producer must recognise these problems, for, after all, the export industrial organisation cannot serve the market any better than the producer serves it with the basic raw material. Irregularity of supplies and indifferent quality will never secure the goodwill of the buying public in any market.

Interstate Trade.

Whether the movement of cattle to Southern States is economic depends, of course, on the locality from which the supply is drawn. No doubt, particularly in regard to store cattle, a certain number can be moved to advantage in this manner. Including fat cattle, the total border trade appears to amount to 30 per cent. of the Queensland yield, but in estimating the available cattle in the locality which might favour this trade, it appears that at least one-third of the supply could be killed in Brisbane to advantage, and shipped as chilled beef. Undoubtedly, too, this trade is expanding, and it may be no great length of time before the coastal areas will furnish large supplies in this direction. To rail live cattle from Brisbane to Sydney would be an economic waste, inasmuch as the cost of railage, and loss through shrinkage, would probably amount to from 30s. to 37s. more per head than the cost of shipping the chilled carcase. A close study of the distribution of live stock and population of the Eastern States of Australia, as at the end of 1925, shows that about 59 per cent. of the cattle, and 16 per cent. of the population, is in Queensland, while 41 per cent. of the cattle, and 84 per cent. of the population, is in the Southern States—New South Wales, Victoria, and South Australia. It further indicates that, if the herd remains about stationary at the 1925 level, the domestic requirements will absorb the equivalent of the present exportable surplus within fifteen years, and well within this period, if the subsequent decrease in the

Queensland herd is not in the meantime restored. It would appear that the time is not far distant when Queensland should be furnishing the Southern States with double the quantity of beef now supplied, and it would seem, therefore, that this is a feature of the industry which will call for systematic development, so that the producers of Queensland, and the consumers of Southern States, can both participate in the benefits of economic distribution. There is a further matter which should be mentioned at this juncture. It is thought in some directions that the production of cattle in Queensland should be permitted to languish until the domestic demand actually overtakes the supply, and that by doing so the producers' problem will be solved. It is perfectly evident, however, that the supply of cattle can never be adjusted to meet the daily requirements of the people, as there will always be months of heavy and corresponding months of light marketing; and, again, years which favour a large, and years which favour a small production. The herd should, therefore, be maintained on a level that ensures sufficient margin to provide for these variations, and, until the limit of resources has been reached, it is economically sound that some measure of surplus should be maintained, not only in the interests of the people in Queensland, but in the interests of the people in the Southern States, who, without supplies from Queensland to make up the shortage in their respective States, would have to be content with less beef or pay fancy prices for it. No primary industry that manages its affairs in this manner can expect to hold the goodwill of the people. Service only is recognised. Irregularity of supplies and price fluctuations will not promote meat consumption, which is a feature the producers must not lose sight of. This completes the examination of the three divisions operating between producer and consumer, and undoubtedly confirms that, under present conditions, the domestic and export industrial organisations cannot respond to higher production costs; also that the interstate business is not developing along economic lines, due to the domestic organisation not being equipped for, and the irregularity of the exporters' business not permitting, a thorough development of this trade.

Production.

The live stock producer has duties and responsibilities which are fundamental to his own prosperity. First, the supply of live stock should be large enough to permit profitable utilisation of the plant, and equipment of the industrial organisation, but on this point it is obvious that an adjustment of the capacity is necessary. Second, the supply, while necessarily varying with seasonal conditions, should be distributed throughout the year as evenly as possible, thus equalising labour and consumption needs. Third, the character of the live stock, in size, quality, and finish, should be such as to meet the needs and desires of the consuming public. The producer must specialise in the breeding of live stock, just as those engaged in any other enterprise must specialise in their particular functions, would they be successful. It is not sufficient that such questions as loss through ticks and bad branding, or damage from horns, bruising, &c., should be matters of opinion. There must be finality on these questions. Of course, producers naturally wish to make a profit, and unless they do make a profit year by year, on an average, production is discouraged.

Where the Industry Stands To-day.

This is where the cattle industry stands to-day, and, while it is a complex problem, it nevertheless must be straightened out, and undoubtedly it is time to begin, otherwise the undertaking will be more difficult later on. The first objective must be towards encouraging more and better production, and the surest way to do so is to concentrate upon reducing the spread between producer and consumer. This can be effected only through a form of industrial organisation suitable to the period, which can secure real economies in operating, and the fullest value for by-products. Any undue burden with which production is saddled should be reconsidered, so that the cattle business, in all its phases, might be stimulated within as short a time as possible. It is an essential industry, and one which cannot be confined to the boundaries of the respective States; and, although it is of a national character, there is perhaps no industry in Australia to-day so lacking in organisation, and the co-ordination of each party to it. It is an industry which can prosper only when each party to it not only performs his functions efficiently, but when all work together, and with full recognition of their respective duties and responsibilities. It may be taken for granted, therefore, that until each group connected with the industry is working in the one direction, and with a common understanding of each other's problems, no definite progress can be made. It is not to be expected that any type of organisation consisting of one group only could make any effective headway. Countries which have succeeded in lifting the live stock and meat industry to a high state of efficiency have done so through the co-ordination suggested, with the industrial organisation furnishing the constructive force for the benefit of all groups.

Attempts Towards Organisation.

During the past few years several schemes have been suggested for the improvement of the Australian live stock and meat industry, the beef cattle industry in particular, culminating in the formation of the Australian Meat Council, which, after functioning for a few years, was disbanded. The Commonwealth Government has certainly been sympathetic, and has endeavoured to find a solution to the problem. It is now proposed to establish an Australian Meat Board, with subsidiary boards in each State, the functions of which will be to promote the interests of meat producers in the production, sale, and marketing of their products; to confer with the exporters and with the Commonwealth and State Governments. The needs of the live stock and meat industry of Australia, however, appear to be much greater than the relief any such organisation can be expected to afford. Concentrating upon the exportable surplus of 20 per cent. of the yield, and overlooking the fact that 80 per cent. of the production is a domestic matter, has probably contributed more than anything else to the present unsatisfactory state of the cattle industry. The apparent indifference to quality for the domestic trade; the out-of-date methods of treatment of the greater portion of the stock treated; an almost entire absence of analytical chemistry and scientific research; and the lack of organisation and co-operation, could hardly be expected to result in any other condition. The maintenance of an exportable surplus is important, but, in proportion, it would seem to be a secondary matter when any scheme for the reorganisation of the industry is being considered. It would appear that the industry calls for a more complete investigation than has yet been suggested, but this should be the work of a highly trained personnel, rather than be delegated to any organisation representing one particular group or, for that matter, any combination of groups, whose functions could not specifically extend so far.

A National Advisory Board.

It might be suggested, however, that to bring all groups together on a common purpose, a National Live Stock and Meat Industry Board be formed, to include members from live stock associations representing the producers; members from master butchers' associations representing the retailers; members from exporters' associations representing the exporters; and members representing the selling agents; also that State boards be formed to function under the National Board. At first glance, however, it no doubt would be asked: "Whatever in the world have these different groups in common?" which is exactly the attitude of mind responsible, to a large measure, for the position of the industry to-day. They have everything in common. Apparently it is only lack of knowledge of each other's problems that keeps them apart, and the industry in a depressed condition as a whole. In order, therefore, to assist such boards, it might be further suggested that a Commonwealth Live Stock and Meat Industry Advisory Board should be established, with a personnel qualified to study all phases of the industry. The number of consulting members should be restricted to the qualifications required—i.e., live stock production (cattle), live stock production (sheep), producers; general economics of meat industry, plant operations and equipment, industrial management; scientific research, science; industrial relations, labour. The consulting members should be actively engaged and connected with the industry in a capacity which qualifies them to so act on the advisory board, preferably being presided over by a permanent chairman. The consulting members should be approved, and the chairman appointed by, the Commonwealth Government.

A Commonwealth Board.

The function of the Commonwealth Advisory Board should be: To study and advise the Commonwealth Government on all matters appertaining to the industry, from a national standpoint; to advise the State Governments on matters connected with the industry, as affecting the respective States in their relation to the national standpoint; to work with and advise the National and State Boards. The specific matters which the Advisory Board would investigate and study would be as follows:—Live stock production: Commonwealth costs of production, by defined areas; improvement in live stock; character of live stock in relation to demand; regularity of supply; water supply on stock routes. Live stock losses and damage: Ticks; dehorning; branding; bruising. Distribution of live stock: Geographical relationship between human and live stock population; distance from producing to consuming areas; railway organisation and live stock rates; economic methods of distribution. Live stock market operations: Methods of handling, selling, and cost. Grading of live stock: Uniform standards; facilities and service of grading. Inspection: Means of extending ante and post mortem inspection of domestic killing. Research: Develop practical data, and carry on researches into new and scientific problems connected with the industry under the following headings:—Production; marketing; improvement of old and invention of new industrial processes and products; transportation;

and the relative economy composition and nutritive value of the various cuts of meat. Centralised killing: Consider the extension of the system of centralised domestic killing, where and when practicable, and encourage the utilisation of by-products in all killing establishments. Secondary industries: Follow the development of all subsidiary secondary industries. Export: Such a board could study the disabilities of the exporters, and assist them towards a better state of affairs in their branch of the industry. It could possibly be of great assistance to the exporters on such matters as economics in operations, transportations, &c. On the broader questions of Empire development and trade, it would have the necessary knowledge to authoritatively represent the interests of the Commonwealth in respect to the meat industry.

Surplus Producing Areas.

The policy of the board should be to promote the fullest development of the available resources of the country suitable for the production of live stock, particularly investigating the position of Northern Queensland, the Northern Territory, and any other defined areas where cattle production is in a precarious condition. It should consider ways and means of encouraging production in any specific areas, where economic conditions might for the time being be less favourable than in the more thickly populated divisions, where products can be disposed of to better advantage, and where operating expense might be less. For example, after determining the average cost of production in the defined areas, the board might find in one or more the return to the producer is less than cost, and in consequence production is diminishing and the quality of the herd deteriorating. It might be found that, before the industry in such a division or divisions can be restored to a paying basis, an increase in the herd and an improvement in its quality is essential, inasmuch as, through the means of additional volume, the exporter's expense would be reduced, and the improvement in the quality would enhance the value of the products. The producer, however, may not have the resources, nor be in a position to secure the credit, to enable him to effect improvements, the benefits from which would not be immediate, consequently, as time goes on, the position goes from bad to worse. If it is in the interests of the Commonwealth that production in such areas should be maintained, and there should be no doubt on this point, then the advisory board, having thoroughly investigated the position, could bring the matter before the Commonwealth Government, possibly with a recommendation that a reasonable price per 100 lb. delivered weight of the respective export qualities should be guaranteed the producer for a period long enough to enable the improvements to be made. Such a guarantee, however, should be given to producers individually, upon their giving satisfactory evidence to the board that steps will be taken to bring about the necessary improvements in their herds. Anything in the nature of an unqualified subsidy would not be likely to bring about the required change in existing conditions, whereas a guarantee to make possible a desired objective would be more in the nature of a business investment, and would be nationally sound. It could be expected the liability of the Commonwealth would be diminishing throughout the period of the guarantee, and that the benefits derived would be permanent.

Future Considerations.

In course of time all the large cities of the Commonwealth, no doubt, will have large public killing establishments, such as in Sydney and Adelaide. With similar single units in Melbourne and Brisbane to those already existing in Sydney and Adelaide, the average tonnage per unit of these main plants would compare favourably with the average tonnage per unit of the Argentine plants, thus providing an industrial organisation of competitive dimensions that could be availed of for export killing. Other great policy matters may arise in the future, perhaps such questions as direct ownership of these institutions by the people, or the extension of their functions to the point of furnishing the entire service between producer and retailer. These, however, are questions for the future to determine. The immediate suggestion is to grapple with the very adverse condition of the industry as it stands to-day, and through the means of an organisation broad enough to broaden with the future. Australia is destined to expand, and the live stock and meat industry, as a whole, to fulfil its economic functions, must keep pace with such expansion, otherwise fail to pull its weight in the future development of the Commonwealth.

Conclusion.

The intention of this paper is to afford a brief general insight into the existing condition of the live stock and meat industry, and to suggest what might lead to a practical and effective basis of organising it, so that this great industry can

be guided to a state of proficiency. Immense changes bearing on the question of competitive costs are taking place in the world of industry and business to-day. Science and engineering are for ever concentrating in this direction; enlarged volume has become an essential; intelligent and accurate data has become an absolute necessity; positive elimination of waste is being sought; in fact, every old method, process, and product is being challenged in one way or another, and any country that sits idly by, cannot hope to keep its place in the competitive markets of the world to-day. On the other hand, should the industry of this country seriously adopt a progressive attitude, sinking individual interest in favour of organised effort, it can no doubt look for a fair measure of governmental support in the solution of its initial problems, thus enabling it to approach a more secure and prosperous condition for itself, and for the welfare of the country in general.

THE MEAT INDUSTRY EXHIBIT.

Mr. J. B. Cramsie (chairman of the Metropolitan Meat Industry Board of New South Wales) congratulated Mr. Sunners on his paper. "This is the finest exhibition of its kind I have ever seen," he said. "I was asked if this is a better show than the one we had at Sydney. It is better, undoubtedly, but next year we will have a better show than yours. With the same spirit of harmony and co-operation that exists now, we will make the producers realise the necessity for organising their industry on a thoroughly profitable basis.

"Make Queensland the Best Mutton-producing State!"

"I have not seen, in my experience of more than thirty years, such high quality sheep as those in the refrigerating chamber. I did not think it was possible to produce such quality outside of New Zealand. They are Corriedales, and they are without compare. My only regret is that they are not produced in greater numbers in the Darling Downs, to make Queensland the best mutton-producing State in the Commonwealth."

The Beef Exhibits.

Mr. Cramsie said the beef exhibition was an excellent one. It was ridiculous to say that Queensland could not produce early-maturing beef. If breeders would take the cut-outs in the exhibition as their model types they would have nothing to fear from the Argentine. Two years ago he spent eighteen months touring the world in the interests of the Australian meat industry, and he came back convinced that the time was ripe for Australia to go ahead and take her place as one of the best meat-producing countries in the world. He hoped, as a result of the exhibition, that people would realise the necessity for proper organisation of the industry which was so necessary for the development of Australia. "This country was developed originally by cattle men," declared Mr. Cramsie, "and until we have the whole of our country under occupation it will be necessary for the cattle industry to prosper. Our forefathers, who pioneered the producing industry, had plenty of difficulties to overcome, but they overcame them, and we will have to do the same. It is only by organisation that Australia can take her proper place as one of the biggest meat-producing countries of the world, and the country that will remain for all time the supplier to the markets of Great Britain." (Cheers.)

Mr. W. H. Paine (head of the publicity branch of the Metropolitan Meat Industry Board of New South Wales) spoke of the necessity for breeding good cattle to get good by-products. "Good quality cattle means larger income from by-products," he said.

Mr. J. L. Wilson (Calliope) proposed a vote of thanks to the Acting Premier, which was carried with acclamation, and Mr. Smith briefly responded.

"Super Excellent."

In the course of a subsequent Press interview Mr. Cramsie, referring to the Meat Industry Exhibit, said:—

"This display is super-excellent. After an eighteen months' tour of the world in the interests of the Australian meat industry, I can conscientiously say I have never seen a finer display, and I saw all that was to be seen."

Mr. Cramsie added: "It shows that Queensland can produce a quality of beef equal to that from any other producing country in the world, and let us hope that one result of this display will be that the Queensland producer will be immensely heartened, and will do his share in organising this important industry in its various stages of production, treatment, transport, and marketing, so that the industry can be put on a sound footing, and become a really profitable one, not only for the primary producer but also for all others concerned."

Australian Secondary Industries.

Mr. Cramsie was particularly pleased with the display from the point of view of production, treatment, and by-products, right through the secondary industries, and their finalised products, which have been brought back from various countries where they are manufactured at present. "I hope, however," he said, "that these higher grade by-products will be manufactured in Australia in the near future, in furtherance of our new secondary industry policy."

Mr. Cramsie urged every one interested in the meat industry to study the slogans in the pavilion.

The Meat Industry Exhibit, which was one of the finest features of this year's Show, is described in detail in our Special Show Report in this issue.

PLATE 89.—JAMES A. HEADING, D.C.M., M.M.

Mr. Heading, who has been re-elected Chairman of the Queensland Co-operative Bacon Association, Ltd., Murarrie, is on the Board of Directors of the Farmers' Co-operative Distributing Co., Ltd., and also the South Burnett Co-operative Dairying Co., Ltd. He is Chairman of the Murgon Shire Council and President of the Murgon Show Society.

He served during the Great War with the 47th Battalion, A.I.F., and was awarded the Distinguished Conduct Medal and the Military Medal for conspicuous valour in the field.

PIGS AT THE BRISBANE SHOW.

E. J. SHELTON, H.D.A., Instructor in Pig Raising.

The increased interest evidenced throughout Queensland in the production of more and better pigs on every farm, was again emphasised in a striking manner at this year's Royal National Show at Brisbane, at which a splendid entry of good-quality pigs, comprising representatives of all the breeds common in Australia, was penned. The Pig Section at exhibitions of this nature always attracts considerable attention; it draws more than its proportion of the crowd of spectators and is of the greatest educational value. People see the pigs in their Sunday dress, as it were, and are attracted to them in a way hardly possible on the farm, where piggy does not always receive his fair share of attention or comfort. It is educational also in that people from far and near have an opportunity of inspecting representative males and females in the several breeds and of comparing their type and quality with those of other breeds, with which they are, possibly, not altogether conversant. It carries an educational value also in that it shows that, if given reasonable care and attention, and if provided with anything like satisfactory accommodation, pigs can be kept clean and healthy and in an attractive condition. People see the pigs in clean, comfortable, commodious pens, nicely bedded down with clean straw from which no unpleasant odours emanate, nor with which people of any class could find complaint. This is one of the most important features of the Show, for, unfortunately, there is a very erroneous impression abroad that pigs are other than clean, healthy animals. A visit to the pig pens at the Exhibition dispels this idea and creates quite a favourable impression of His Majesty the Hog.

This year, owing to Quarantine Regulations, the showing of pigs was confined solely to Queensland-owned animals from Queensland farms; no interstate porcine stock being admitted to competition. This being so, it was indeed satisfactory to note that the entry was well up to the standard of previous years and the quality quite as good. The number of exhibitors was also well up to that of former shows, the ranks of the absent Southern exhibitors being well filled by new and enthusiastic Queenslanders making their first attempt at exhibiting at a big show like the Royal National. Quite a satisfactory feature of this, too, was the fact that a number of these new exhibitors were folk who have become interested in better pigs per medium of successful Pig Clubs in operation in their respective districts. This is quite as it should be, and indicates the possibilities and advantages of club membership and enthusiasm. Several special classes were provided for Pig Club members and, though the entry was not large, it was complete. As an instance, George and Eileen Davison, Pig Club members from the North Arm School, penned several of their Large Black pigs. George Davison, junior, won a Large Black boar, presented by Captain Callcott, an enthusiastic Victorian breeder, at the North Arm School Pig Club contest last year. After the judging, George's father came to the writer and stated that he had decided, in consultation with his children, to have me select for them a suitable Large Black sow. This was done, and the result has been that the Davison family have since sold quite a number of selected stud boars and sows at from 6 guineas each upwards, and have booked orders for a number more.

Another typical instance was the Tamworth bacon pigs, exhibited by the Alford boys, members of the Pomona Pig Club. These people have become successful breeders of Tamworth pigs; they have three boys as members of the Pig Club and have made numerous sales. The Palmwoods State School Pig Club, represented by the Roy boys, sons of Mr. and Mrs. C. F. A. Roy, of Palmwoods, have also, through winning a Middle Yorkshire sow and through purchasing from another club member a Middle Yorkshire boar, also donated by Mr. Ralph Joyce, a prominent Victorian breeder, of Kyabram, Victoria, now become quite established as breeders of Middle Yorkshires and, at exhibition time, had practically 100 guineas' worth of stud stock on hand. At the stud sales, one of their boars was sold to a resident of New Guinea, another two to farmers at Gayndah and Coalstoun Lakes, another to the Colonial Sugar Refining Company's mill at Macnade, North Queensland, and several to breeders, including the Salvation Army Training Farm for Boys at Riverview, Queensland. They booked orders for other pigs from a litter expected shortly. The Cordwell Brothers, of Kureelpa, members of the Mapleton Pig Club, though not exhibitors at the Exhibition themselves, had some of their pigs entered in the name of their father, Mr. W. Cordwell, of "Allendale," Kureelpa. This gentleman, in discussing the value of this feature of pig raising, admitted freely that their success as breeders of Poland-China pigs was due entirely to Pig Club work; they had some excellent quality stock, won several prizes, sold several sows at 6 guineas each at four months' old, and are on the highway to a successful future. Mr. Cordwell freely assured me that his farm revenue has increased by more than £100

per annum since his boys have taken up this class of work and have introduced better quality stock, for which they have many buyers. One of George Davison's Large Black boars realised 14 guineas at public auction, and it is quite certain that had he offered his stud sow, "Wattle Violet," she would have topped the sales.

The Boonah Rural School had a pair of excellent quality Berkshire boars entered. They won first prize, and were really very attractive animals.

Another new and attractive feature at this year's Exhibition was the Litter Weight Contest, in which one litter of pigs, weighing 1,478 lb., was shown, and another litter just three months old topped the scales at 651 lb. These litters were well worth inspection, the winning litter of Gloucester Old Spots shown by the Kingston Pig Farm Co., were really choice. The second prize litter, owner by Mr. George Setch, of Marburg, of excellent type and quality and well worth seeing, were of the Berkshire-Tamworth cross. The Berkshires shown by the Gatton College sold readily at auction at stud values.

The Bacon Pig Carcase Contest, another new class, created quite a big interest and featured several new and important ideas in regard to the production of bacon

PLATE 90.—G. F. DAVISON'S FIRST PRIZE LARGE BLACK SOW, "WATTLE VIOLET," BRISBANE SHOW, 1927.

The Large Black breed of pig, recently introduced into Queensland, comes with a good reputation for prolificacy, heavy milking capacity, and docility. The breed has a value especially for cross-breeding purposes for bacon pig production, and is a favourite with many farmers. Several of this sow's progeny were entered in the Pig Club Classes, one young boar realising fourteen guineas, at auction, at five months old. This sow's first litter of nine reared were valued by the Instructor in Pig Raising at more than ninety guineas.

pigs. Mr. Percy Campbell, of Lamington, won the first and third prizes in this class with Duroc Jersey crosses, while the Kingston Pig Farm Co. annexed second with a pen of Gloucester Old Spot-Tamworth crosses. Quite a number of pigs in this competition were over-weight and too fat for best local trade. The class has been productive of a great deal of good.

The pen of Model Bacon Pigs, including Tamworth Berkshire crosses and a Middle Yorkshire champion from the Nambour Pig Club, and owned by William Lowe, were also well worth inspection. There were three pens of good-quality porkers quite close to the Model Baconers and to the Pig Club classes.

The Berkshires.

The championships in the Berkshire section were won by Mr. H. Franke, of Cawdor, who won with both boar and sow, the reserve in the boar classes going to Goodna Hospital and in the sow classes to Mr. Mat. Porter, of Wondai. The Empire Challenge Cups were thus won by Mr. Franke, who also annexed the ribbons presented by the Australian Stud Pig Breeders' Society. At a later stage Mr. H. Franke won the silver cup presented by Mr. R. G. Watson for the most successful exhibitor in the pig section; Mr. C. W. Krause, of the Marburg district, being a very close runner-up. The Berkshire section invariably attracts a good entry, this breed still retaining pride of place as far as general popularity goes in this State. The entry of young stock particularly was well worthy of notice; admittedly there were no "record-breakers" at the Stud Sales. The general average was, however, well up to the standard of former shows and proved quite a valuable addition to the Stock Sales of the Show.

The Yorkshires.

We have no Large Yorkshires in Queensland yet, so that competition was restricted to the Middle Yorkshire breed. Competition in this section is always more or less limited at Brisbane, though undoubtedly the quality is there. On this occasion there were only two—but two very enthusiastic—exhibitors, both of whose pigs were shown in good breeding condition—not over-fat. The champion boar was the property of Mr. Max Gornik, of the Manly-Wynnum district. In the younger classes Mr. C. F. A. Roy and his Pig Club members from the Palmwoods district were successful, winning both first and second prizes in several classes. The Middle Yorkshire seems to be slowly regaining its former popularity, especially for cross-breeding purposes with the Berkshire.

The Tamworths.

As is usual at the Brisbane Show, Tamworth pigs were well represented, this breed having forged ahead in popular favour in recent years with all classes of the farming community. The exhibits at the Show created quite a favourable impression, particularly the bacon pigs of the Tamworth-Berkshire cross exhibited in the Litter Weight Contest, in the Bacon Pig Carcase Contest, and in the Model Bacon Pig pens.

The Gatton College annexed the championship in the boar classes; they also won the reserve championships, that for sows going to the Dunwich Hospital, Stradbroke Island. There were many fine-quality Tamworth pigs exhibited; particularly fine were many of the young pigs under twelve months old. While such high-quality "Red Pigs" come forward there is not likely to be any slackening in the demand or loss of popularity in the breed.

Yet it cannot be said that the Tamworth breed shows to advantage in the somewhat confined area allotted to this breed at the Show. Tamworths show up to more advantage in a good sweet potato patch or grazing over succulent lucerne paddocks. It is not the nature of the Tamworth pig to be closely confined or continuously penned—he was not developed for that purpose. He gives of his best when allowed range and abundant supplies of bulky foods. It is for this reason that Tamworth sows and litters do not appear so comfortable or so attractive as the Berkshires or the Yorkshires, &c.

The Poland-Chinas.

While the foregoing is certainly true of the modern representatives of the original wild pig of Old England (the Tamworth) it does not apply in the same way to the American breeds, especially the Poland-China for, with their glossy, black coats, sparsely marked with white points, they show their good qualities to considerable advantage.

The exhibitors in this section, too, had spared no effort in vieing one with the other to show their stock to the best advantage possible. As it happened, there were about an equal number of new and old-established breeders competing, the former including Mr. C. W. Krause, of Marburg, winner of the championship in the boar classes and other prizes, and Mr. W. Cordwell, of Kureelpa, a successful exhibitor of young stock. Mr. Alan Cooke, of Maleny, was also included, though his entry was confined to one animal only. The Kingston Pig Farm Company could also be classed as a new exhibitor in this section, though they have exhibited in other pig classes at former shows. Of the old-established breeders, Mr. J. H. Whittaker, of Broxburn, on the Darling Downs, and the Queensland Agricultural

College and High School, Gatton (still well and favourably known as the Gatton College), were successful.

Altogether, the Poland-Chinas were very good, though the tendency in this breed is for the animals to be shown almost in an over-fat condition.

The Duroc-Jerseys.

Both championships in these classes were annexed by Mr. Percy V. Campbell, of "Lawn Hill," Lamington, via Beaudesert. The largest exhibitor and breeder of this type in this State, Mr. Campbell's pigs were shown in ideal condition; his experience with this breed has been such as to create a very favourable impression. A customer of his, Mr. W. Koehler, of Yamsion (a new exhibitor, too), was also a competitor, and scored a proportion of the prizes, his pigs being favourably commented on. The Duroc-Jersey is as yet a new breed in this State, though it has had a three years' run. Breeders of this type are handicapped in their progress by the difficulty of securing fresh and unrelated strains of blood. The breed has proved its capabilities as far as it has been possible for them to do, and the fact that they

PLATE 91.—THE FIRST PRIZE LITTER IN THE LITTER-WEIGHT CONTEST AT BRISBANE SHOW, 1927. SHOWN BY THE KINGSTON PIG FARM CO., KINGSTON.

Pure-bred Gloucester Old Spots, carrying imported blood, of the most up-to-date type. The nine pigs in this litter, exactly three months old on Judging Day, weighed 651 lb., an average of 72⅓ lb. These pigs were well developed, were even in size, and were growing rapidly. The Litter-Weight Contest is well worth studying; it is a new class at Agricultural Shows, and must be clearly understood to be appreciated. Details may be obtained on application to the Department of Agriculture and Stock.

came out on top in the Bacon Pig Carcase Contest adds more laurels to their crown. Without doubt, the breed has come to stay, for breeders far and near are interested in these "Red Americans," and seem intent on continuing the experiments.

The Gloucester Old Spots.

It is not the intention in this article to write up the breeds in their order of merit or in the order in which they are catered for in the Show schedules, nor are the remarks based on the number of entries or successes. Nevertheless, the G.O.S. (as it is most frequently referred to in literature) created a very favourable impression, this year's exhibits being the best that has yet been seen at any show in Australia, though the exhibits at the Melbourne Show always attract considerable attention and are of high quality.

The Kingston Pig Farm Company, of which Mr. R. G. Watson, the well-known auctioneer and the former secretary of the Queensland Branch of the Australian Stud Pig Breeders' Society, is principal, were the only exhibitors, and consequently annexed all the prizes in this section of the Show. Mr. Bert. Whittaker, a graduate of the Young Judges' Competitions and an enthusiastic junior in the pig world and his mate "Bill," were in charge of the Kingston entries and had them in excellent form. This breed continues to make rapid progress and to create a favourable impression among both pork and bacon pig fanciers. It is an Old World breed with a reputation dating back many years and, though among the most recent introductions here, has made headway indicative of future successes and is, therefore, already well established.

Crosses of this type were shown in the Litter Weight Contest, Bacon Pig Carcase Contest, and in the Pork classes.

Large Blacks.

Though entries in the Large Black classes were confined to the exhibits of Mr. G. F. Davison, of North Arm, and his son George, they were, nevertheless, of good quality and of up-to-date type, the quality of the imported sow "Wattle Violet,"

Plate 92.—The Second Prize Litter in the Litter-Weight Contest Class at Brisbane Show. Shown by Mr. George Letch, of Marburg.

The ten pigs in this Litter, at five months and three days old, turned the scales at 1,478 lb. It is probably the heaviest Litter yet exhibited at an Australian show. The sire, a pure bred Berkshire, the dam a crossbred Berkshire-Tamworth sow. There were fourteen pigs in the Litter, of which ten were reared. Average weight per pig, 147·8 lb., at five months three days old.

comparing more than favourably with illustrations of stock exhibited at the Royal Agricultural Shows of England and other countries.

This is a breed with an excellent reputation, many farmers having a great fancy for the long, roomy, deep-bodied, heavy-milking sows for cross-breeding purposes.

In general outline and type there is not a world of difference between the Gloucester Old Spot and the Large Black; in fact, they are both original types from Old British stock, the former coming from Gloucestershire, the latter from Devon and Cornwall, and both now well distributed throughout the world. At any rate, if Large Blacks of equal quality and of similar type can be produced continuously in the North, the demand will follow and the breed will regain its early popularity.

Display of Pork and Bacon Products in the Live Stock and Meat Industry Hall.

Reference to this section of the Show activities would not be complete without reference to the display of Fresh Pork and of Pork Products in the new Live Stock and Meat Industry Hall (see Plate 86) in which, in addition to the general display of manufactured products as shown, the display of fresh pork and pork delicacies and bacon pig carcases was included, the latter in the specially constructed glass refrigerating chambers occupying the whole of one end of the hall.

The attractive and instructive fresh pork display, tastefully prepared and arranged under the guidance of Mr. Brunckhurst, manager of the State Butcheries, was a show in itself and drew the attention of thousands of spectators as they moved around this hall of wonder—a special feature of the Exhibition. The display of beef and mutton and of the various products resulting therefrom, together with the trade displays, were a sight long to be remembered, and it is satisfactory to note that just as favourable comment was passed on the Pork and Pork Products display as on any other section of those staged.

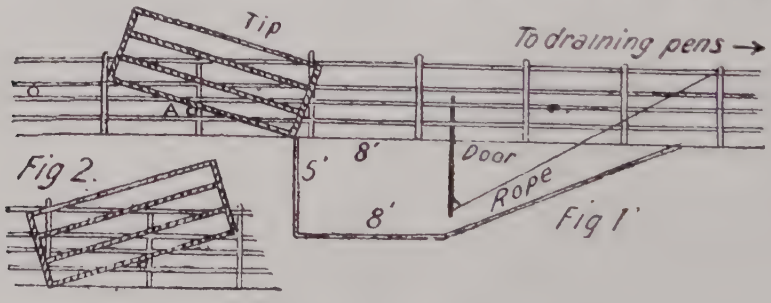
The Pork Products display featured not only the usual manufactured products—bacon, hams, and lard—but all manner of lines from the salted intestines used for sausage casings, the blood used as stock food and as a fertilizer, the various internal organs and the products manufactured therefrom, right down to the gall from the liver, which product is not wasted, it being used in the printing trade as a special necessity. Hoofs and glue pieces used specially in the manufacture of glue; lard oil manufactured from lard; hair used in upholstering work, &c.; the skin of the pig used as leather for permanent durable covers for specially prepared saddles, suitcases, pocket wallets, purses, &c.; canned goods, including every variety of sausage, saveloys, Camp Pie, Rex Pye, pork brawn, pork and beans, and minor sandwich lines, ham pates, &c., Devon sausage, Strasburg sausage, ham delight, black and white puddings, brawn, bloodwurst, liverwurst, &c. Lard was shown packed in cans for export and in bladders and 1 lb. pats for local trade, while in addition to sides, flitches, shoulders and hams, rolled bacon, a special delicacy, was shown.

The display comprised a most attractive collection of Pork Products and drew admiring crowds throughout the Show.

In the Court of the Department of Agriculture and Stock a special display of Pork Products was also tastefully arranged and was much admired. Altogether, the Pig, Pork, and Bacon sections added considerable interest and value to the national display of Queensland's primary and industrial products.

DIPPING DEVICE.

At the request of a Tasmanian correspondent, a tip device for dipping sheep is reproduced:—When small sheep dips are used, it is necessary to do a certain amount of lifting, and when big wethers are being handled this is a heavy piece of work. Mr. J. S. Mortimer, of Katunga, to obviate this handling, employs a tip as shown in the illustration. The tip is balanced on a piece of iron piping, which rests on the rails of the fence, the piping being nearer the entrance end. When the sheep are entering the tip, the end nearer the dip is sustained by a rail underneath it and



resting on two fence rails, as in Fig. 2. When the cross rail is withdrawn, the tip falls down, sliding the sheep into the dip. Mr. Mortimer's dip is 20 feet long by 2 feet wide at the top, 8 feet long by 1 foot wide at the bottom, and 5 feet deep, built of bricks in cement. He places great value on the swing door, by means of which sheep are kept in the liquid for about a minute, after which the door is lifted by the rope tied to the top rail of the fence.—"Australasian."

COTTON-GROWING IN 1860.

Mr. J. W. Willis-Jenyns, of Main street, Kangaroo Point, forwards the following interesting note, together with a photograph of two highly-esteemed pioneers, Mr. and Mrs. E. E. Caswell, who represent the finest type of early Queensland settler, and to whom the State, built largely on the grit and enterprise of our first farmers, is greatly indebted.

In the early sixties of last century cotton-growing was a subject of keen interest to Queensland farmers. Mr. Pratten, of Eight-mile Plains, grew a paddock of Sea Island cotton. The Governor (Sir Geo. Bowen), Lady Bowen, and party rode out on

Plate 93.—Queensland Pioneers—Mr. and Mrs. E. E. Caswell, of "Coburn," Wangalpong.

horseback to see the new venture. He commended the grower on the very fine crops, the bolls being exceptionally well formed, showing a long silky staple. A contest had been arranged, Miss Wright, who was living with Mrs. Pratten, proving the winner, and though only twelve years of age, she picked 120 lb. of clean cotton, receiving the congratulations of the Governor and others present for her skill and endurance. She became known as the champion cotton-picker. Mrs. E. E. Caswell (née Wright) is still active at the advanced age of seventy-nine years, and with her husband, who is ninety years of age, is living at Coburn, Wangalpong, where they are held in very high esteem. They have a family of twelve children (all living), and many grandchildren.

If you like the "Journal," kindly bring it under the notice of your neighbours who are not already subscribers. To farmers it is free and the annual charge of one shilling is merely to cover postage for the twelve months.

SHEEP ON THE ATHERTON TABLELANDS.

PROBLEMS DISCUSSED.

WHAT TO DO—AND AVOID. A TALK TO FARMERS.

By MR. W. G. BROWN, Sheep and Wool Expert, Department of Agriculture.

It is nearly three years since I visited the Tableland, and after three weeks' close inspection, lectures at various centres on the possibilities of sheep culture, especially on the lines of production of fat lambs and sheep, I found, of course, that there were drawbacks, but allowing for these, I came to the conclusion that there is no part of Queensland with better natural advantages for the business than the Evelyn and Atherton Tableland.

I have had no opportunity since then, until recently, to revisit the country and see what was being done. I have just returned after a three weeks' inspection of conditions. The weather was very unpropitious, it having rained for the whole time. Thus I was prevented, owing to the state of the roads, from making as thorough an inspection as I would have liked; yet I saw sufficient to make a clear and definite statement that I see no reason at all to change my first opinion.

At the invitation of Mr. W. A. Whiting, President of the Atherton Local Producers' Association, I delivered an address on "Sheep on the Tablelands" to a very good audience of farmers at Atherton on the 15th July. Below I submit the gist of what I said.

Worms and Footrot.

Before I went out on this trip I heard most alarming reports of damage done by the stomach worm and footrot; all the sheep poor and dying, &c. Now I have no doubt that stomach worms are present, but in only one case out of many I investigated did I find them seriously damaging the flock. In every holding I killed a sheep and found them quite free of stomach worms. Yet a great many of the animals were poor, miserable, and dying. I saw, also, very many poor, miserable poddy lambs, and the mortality was appalling. I saw, also, many lame sheep. On the other hand, I saw sheep, lambs, and weaners thriving as well as any sheep I know of in the same flocks as the unthrifty animals. Paradoxical, until investigation was made.

The Wrong Sheep.

In every lecture, pamphlet, or radio address I have stated definitely for years, and clearly, that Merino sheep never were nor will ever be suitable sheep for coastal areas on the Northern Tablelands.

What do I find on this visit to the Tableland? I find that thousands of Merino ewes and wethers have been bought, which have been starving in the West for many months, put on the trucks at Hughenden and other centres, arriving on the Tableland with from 10 to 20 per cent. dead in the trucks, with further losses after being put on the farms. I found that, in most cases, the sheep were old, many of them broken-mouthed and "gummy." They had left very dry western country to arrive into months of rain, and grass which is never dry. Merino sheep, even when young and strong, hate going into wet grass. If they are continually on wet pasture they suffer from foot and other troubles. Naturally those who were considering sheep turned away from the proposition. Wherever I found crossbreds, they were thriving, because by their ancestry they were suitable sheep for the moist conditions. I am entitled to feel very sore when, after all my warnings, my teaching is either despised or forgotten, which is the same thing.

Soil Deficiencies.

Besides the unsuitability of the Merino as a fat sheep proposition, even in dry weather conditions on the Tableland, there is another, and, I believe, very important question to be answered.

The chief crop in Queensland is grass. The greatest production of the State, and of Australia, for that matter, is given by the pastoral business; 34 per cent. of the income tax, for instance, is paid by pastoralists.

It is well known that phosphoric acid and lime are the most important elements which enter into the production of beef, wool, mutton, butter, milk, &c. It is also known that the soils of this State, even on virgin country, are well supplied with these. Yet year after year for many decades past these essential minerals have been taken from the pastures, which take them from the soil—when they are there—and sent abroad in the various commodities produced from the land, and nothing has been or is being returned. The soil is starved, the grass is starved, and, as a

consequence, the animals are starved. It is quite safe to say that the herbage is not half as nutritious as it was, say, thirty years ago. This applies particularly to the Tableland. The animals I saw on the Tableland are starving in the midst of what seems to be plenty, but isn't. The soil of the Tableland is rich, deep, and very porous. It is in consequence of this porosity that whatever amount of soluble lime and phosphoric acid be in the soil under dry conditions, they are leached down into depths where the roots of the grasses cannot reach them.

Lambing—The Wrong Time.

In winter time, too, most grasses are at their lowest in nutritive qualities, yet the Tableland sheep farmers have seen fit to time their lambing now, when the phosphates and lime, &c., are low, and the nutrition in the grass is at its lowest. No wonder the ewes are weaning their progeny prematurely. August or September are proper months here. This part of the subject could be extended to much greater length, but space does not permit. Enough has been said, I think, to point out the cause of malnutrition of the sheep I saw.

Case for the Crossbred.

Of course, it will be said that what applies to the Merino should also apply to the crossbreds. That is true, but not to nearly the same extent as in the case of Merinos. Crossbreds eat plentifully of bushes and leaves of trees, &c., which have deeper roots than grasses, and so obtain more of the soluble elements of the soil. They are, besides, more voracious eaters and not nearly as dainty as Merinos. They are, too, owing to their ancestry, accustomed to rain, snow, and wet soils. They have also far harder feet, and so do not suffer from foot troubles.

The Romney Marsh is an ideal sheep for the district, with the Border Leicester a good second. I cannot say yet whether the Corriedale will stand up to the Tableland conditions. I believe they will.

Ills—And Remedies.

It would be idle to advocate the keeping of sheep on the Tableland if remedies for such ills as are to be found cannot be given, if efficacious and reasonably cheap.

As a remedy for the lack of phosphoric acid and lime, a little should be given. Salt, 60 lb.; finely ground Nauru phosphates, 40 lb.; well mixed. Nauru phosphates contain 40 per cent. phosphoric acid and 28 per cent. lime. The sheep should also be given in the winter and spring months from 3 to 4 oz. of whole maize per day per head. This may be broadcasted on a bare place, and the animals will pick up every grain. This is a much better method than putting the maize in troughs. With the troughs the strong sheep can shoulder away the weak one and get an undue share of the rations.

The drench for worms seems to be well known wherever I have been. There is none better than the departmental drench. For other details in sheep management I would refer the farmer to "The Farmer's Sheep in Queensland and Stock Foods." These may be obtained, free, from the Department of Agriculture and Stock, on application.

How to Stock.

The trouble that has arisen caused by buying sheep without inspection or knowledge is an important factor in stocking the Tableland. It is far easier to buy 1,000 sheep than 50—the number I advise beginners to take on. Crossbreds should be acquired, as thereby three years are saved in the production of fat lambs. I am indebted to Mr. C. Harding, Atherton, for a very good suggestion in respect of that matter. His idea was that a group of, say, twenty men should club their money together and hire a thoroughly qualified man to purchase suitable sheep. As I said above, fifty sheep and one ram is quite enough to start on. It would be a trifling sum if each shared the expense of such a man. If each inspected on his own, the expenses would be prohibitive even if each were experienced. If such a group were formed I know a dozen good men in Brisbane who would take it on, at a reasonable charge.

Another important question is, "What number of sheep per acre should the Tableland farmer run on average paspalum country?" This is difficult to answer without inspection. I think five ewes per acre, if they are treated properly, are not too many on most of the country I have seen. I met one man who is running 400 sheep on 30 acres. He will not be running them long. This is an extreme case. When the farmer has had sheep for a couple of years he should have a good idea. An approximate estimate can be given by stating that one head of cattle is equal to about six sheep. The returns are £1 sterling per ewe per annum in lamb and wool, if the animals be properly cared for. This is conservative.

Mixed Farming.

I have run up near to limits of space for the present. I shall return to it later on other points of discussion.

I regret that such advice in regard to the Merino has not been taken, but I hope that this present advice on the top of the farmers' troubles will not fall on barren ground. The farmers can be assured of this—high-priced farming land cannot be profitably used without sheep. They must come to the Tableland sooner or later; I hope it will be soon. There is an empty market from Rockhampton north, which cannot be supplied adequately for years. When it is supplied then the whole world will be open for mutton, lamb, and wool. I may not see this, but it will certainly come, because it must if farming is to be profitable. "Mixed farming" with sheep as a factor should be the slogan.

THE FOREST ESTATE.

By E. H. F. SWAIN, Chairman, Forestry Board.*

I am asked to try and interest you for forty minutes in matters pertaining to the management of the Forest Estate or otherwise in Forestry, which is an industry devoted to the production and handling of the principal raw materials later to be used in the manufacture of such things as houses and buildings, tables and chairs, bedsteads and wardrobes, pianos and organs, fiddles and fifes, pens and pencils, ink and paper, artificial silks and wools, celluloid and tortoise-shell combs, toothpicks and matches, billiards and beerfroth, quinine and eucalyptus, charcoal and creosote, corn-cures and vinegar, guncotton and chloroform, collars and studs, dolls and playballs, formalin and methylated spirits, rope and bootlaces, suitcases and linoleum, leather soling and babies' dummies, corks and erasers, dyes and gums, cascara sagrada and rubra gummi, perfumes and explosives, railways and tramways, steamships and aeroplanes, cricket and golf kits, and all the other unobviously tree-born things that fill up the workaday world of to-day.

Forestry a Prime Industrial Factor.

Forestry in short and in fact is a primary producer of raw products which feed a multiplied and increasing array of other dependent industries. It is an unobvious industry because its forest factories are hidden in the bush behind the scenes of Government, as enterprises of State, and because its products and derivatives are either as obvious as air and water and other gifts of Nature or as unobvious as they can possibly be made by an utter unresemblance to their parents.,

Nevertheless, the operations and activities that are a-doing on or about the Forest Estate more than casually concern the citizen and affect even the business and doings of Real Estate, since they provide much of the wherewithal with which the business of Real Estate is conducted—to wit, the houses and buildings aforesaid, with their furnishings and panellings in Silkwood and Silky Oak and Walnut Bean, their shade trees and avenued frontages, and the very water supply which has been conserved for them by the State Forests of the mountain watersheds and conveyed to them in pipes mined with the aid of wooden props.

From the very beginning man has made his home in or of the forest.

> "When the Great Architect conceived the plan,
> To build a habitation fit for man,
> Earth was not counted perfect from His hand,
> Till streams and forests gladdened all the land.
>
> "Great forests like huge temples builded high,
> With frondent columns reaching towards the sky,
> Firm founded in the rich maturing ground,
> Their roofs with Nature's glorious verdure crowned."

But man is clever and delights to create his own heaven and earth, to paint the lily, and generally to reduce to his own ideals of economic tidiness the apparently disordered opulence of untidy Nature. Nor has he remained long content with the forest for a home. The impulse to a higher standard of living, to social betterment, to systemised hours of labour and to a systemised life seized him early in his leafy habitation of earth, and he shortly commenced to cut down the living wood of his original home as a savage or sylvager, in order to replace it with the storied

*In a recent address before the Real Estate Institute.

wooden caves of the latter-day citydoms in which men do now congregate all the world over to the greater glory of Real Estate and the greater business of the gentlemen engaged therein.

Ante-Adamite Industry.

Man has been busy since Adam in shaving every vestige of timberland from the smiling face of earth. Within a century he will have got through the job. A hundred years from now the commercial wildwoods of the sphere will have been mopped up, and man will have settled down to his new enthusiasm of showing Nature how to farm forests, as he has shown her already how to handle corn crops of 40 bushels to the acre or more.

We get into a habit of so deploring the disappearance of the past that we perceive not the glories of the future; but the future is as inevitable as the past, and nothing can stay mankind's haste towards a man-made world, a new creation in man's image. The mysterious tangle of the natural wildwood, the forest primeval, will vanish, and in succession will come the regimented tree plantations of the State forests of the next generation, organised wood farms capable of producing a crop of 60,000 feet per acre instead of Nature's 6,000—in sixty years instead of 600—located at the point of maximum economy to the great centres of population and planned on so large and systemised a scale that a magnified logging and sawmilling operation will cut the costs of timber to the heart, and convert to varied use as derivatives the final speck of sawdust, the final head of gum, in factories stationed in the forests almost a whistle reach from the city's edge.

"Great forests like huge temples builded high" can be planned, organised, systemised, sixty years ahead, and made to yield a continuous and never-ending factory production of wooden things in very much the same way as Ford factories and sausage machines turn out Ford cars and sausages.

But the movements afoot on the Forest Estate will yet remain ever indiscernible to the public who gaze above the forest fence, because a billion Ford cars can be placed upon the road before an acre of Hoop Pine can be grown into chairs and tables.

Time the Essence of the Contract.

Time is the essence of the forest contract, and foresters, suffering the labour of creation, seldom live to enjoy the harvest time. For this reason the practice of forestry is unattended by realisable individual triumphs, and for the same reason is generally avoided by private enterprise as an investment. Thus Forestry becomes State enterprise, although by its very nature, its call for individual initiative, for courage under stress of problem and difficulty, for patience and persistence on the time aspect, it is an intensely individualistic undertaking. Thus upon Government, which becomes heir to the possession of the original wild forest lands, with the immediate responsibility for efficient marketing of the original timber stands, falls the final inevitable responsibility for management and recreation of the Forest Estate. Hence you have a Forest Department which surveys the forests, logs, and sells the product, runs State sawmills, takes timber supply contracts, and plans the organised Forest Estate of the future on lines and to an extent calculated to meet the ordinary necessities of your children's children years ahead. In these days, the per capita consumption of wood, per man, woman, and child of the Queensland population, is 100 feet of sawn softwood and 80 feet of sawn hardwood per annum, or, in all, in this year of grace, for a population of 811,200, 146,000,000 feet of sawn timber. But this population is increasing, as did that of the United States of America at our stage of development, at the rate of 2¼ per cent. per annum, so that before the new forest crops are matured in the year 1986, and thereafter there will be in Queensland 3,000,000 people, whose need in timber will be 500,000,000 odd super. feet per annum—three to four times as much as our forest resources of to-day are capable of supplying. In Brisbane alone there will be a population of nearly 1,000,000 souls, and this new and greater Brisbane will use more wood than the whole of Queensland absorbs this year.

Bigger Business in Timber.

All this means bigger business in timber, not a lesser business as argue those people who are advocating conversion of the State forests into private agricultural farms, and simultaneously enjoining a firm and hopeful reliance upon expected miracles of substitution of timber in the future by substitutes manufactured from some other and unknown base. It implies also considered timber farming activity by the State upon a scale sufficient to meet figured out requirements. In

Queensland this involves a softwood plantation scheme of from 5,000 acres a year, and a hardwood regeneration scheme of from 15,000 acres a year, representing a yearly investment of capital amounting to from £100,000. Latterly, private enterprise has entered the Australasian forestry arena as a competitor with State enterprise, following upon the discovery that *Pinus insignis* can be grown to cutting size in Australasia in twenty years instead of 120, as in the case of pines in Europe. The more rapid growth of forests in the Antipodes certainly brings forest management within reach of private enterprise, but State Forestry still holds advantage over private practice in that it already owns the most valuable natural forest lands, can borrow funds at less per cent., saves canvassing, brokerage, and other private company costs, and given equal powers of management under Government as under a private directorate, can hope to produce timber at a price to undersell private production. It is also concerned for the State as a whole, and will not wilfully overproduce. In New Zealand, some twenty odd forestry companies are in operation, and if their prospectus figures were realisable their aggregate production would cover the Pacific Ocean with a hundred times more *Pinus insignis* than could possibly be absorbed. Fortunately, however, their prospectus figures are impossible of realisation, nor does the world want a monotonous timber ration of *Pinus insignis* only. In the Queensland climate *Pinus insignis* becomes negligible as a constituent of the forest farms of the future, and other species must be availed of which are adapted to the semi-tropical environment. Queensland will grow Kauri and Hoop and Cypress Pine and Silky Oak and Maple and a variety of other distinctive species of wood for many and varied purposes, and whilst New Zealand may become purveyor in excelsis of *Pinus insignis* to the world, Queensland will become the producer of a rich range of more valuable woods, and as such become the supplier-in-chief of the Australian market for fancy woods.

Private Forestry Efforts.

Private forestry has much to learn before it can stand firmly upon its feet as a standard private investment. In California, in 1900 to 1910, there was a boom in Eucalyptus planting similar to the present Australasian boom in *Pinus insignis* planting. Some 50,000 acres of Eucalyptus plantations were established by forestry companies operating on the acre share basis. At this date, the best use to which the product has been put is firewood, and half the planted areas are now discovered to have been so uneconomically located with respect to their markets, that half of them are unworkable even for the sale of firewood.

Strange to say California borrowed Eucalyptus planting from us and gave us in return *Pinus insignis*, which in California is not seriously regarded as a timber tree, although in Australia it promises to become one of the most important ingredients of our softwood schemes.

Queensland's Wealth in Wood.

The Forest Estate of Queensland consists of 4,000,000 odd acres of State forest or other forest reservation, on which grow 400 odd different kinds of woody trees, of which around forty odd are known upon the wood market of to-day. One of the functions of a Forest Department is to know the whole 400 of its wooden ingredients, both as articles of commerce and as living things in the forest combination, in order, on the one hand, to prescribe their proper use in industry, and, on the other, their due arrangement in the artificial timber stands which the future contemplates. With regard to the first the Queensland Forest Service undertakes to identify for the industrial world any of these 400 woods of Queensland, and to prescribe suitable ones in replacement of the imported article. With regard to the second there are certain risks in silviculture which in agriculture can be met as they arise by alterations in the annual crops, but to which, in Forestry, we commit ourselves at planting time irrevocably until harvest time. Vegetation which to outward appearance is economically useless and to be cast aside may be requisite to salt an otherwise too artificialised a forest. Nature maintains an equilibrium by an apparent disregard of economy. Man may undermine Nature on top of himself by too great a regard for economy. The German foresters did this in training the primeval beech and oak forests to become pure spruce, only to discover that spruce prosperity was impermanent and involved insect infestation and butt rot. Hence the foresters' search for maximum production must be tempered by a delicate respect for Nature's judgment. In the long run, Nature knows quite a lot more than we give her credit for.

As you know, the Queensland climate is characterised by pelting summer downfalls and drawn-out winter droughts, during which the upper soils are sucked of their moisture by a prevailing high aridity. This state of affairs produces quite

a different vegetative response to that of Europe, where the earth is thoroughly soaked by the cold rains of winter, and summer arrives merely to add warmth to an otherwise fecund soil. The moisture remains near the surface, the trees root shallowly, and moss and undergrowth crowd the floor, so that evaporation is retarded and the water is held by the forest as by a sponge. Contrast the Queensland position where the seeds fall upon the earth in a summer swelter between rain and shine, with only two or three months to dig in against the oncoming droughts of winter, when the upper soils are parched. Hence you have in Queensland not the shallow-rooted trees of Europe, but "dinkum" diggers which send down a tap root each into the subsoil without taking a breath, and thus duly entrench themselves against Nature. This means that only deep rooters survive and the moss and undergrowth of the soil surface are missing except in the catchment hollows where moisture congregates, and saturating the earth has an immense response under our tropical skies in the high jungles which are known to Queenslanders by the affectionate diminutive of "scrubs."

These factors decide for Queensland the type and arrangement of its forests. The softwood jungles fill the alluvial bottoms of the 30-100-inch rainfall belt fringing the long stretch of coast. They are essentially and naturally of patchy distribution standing out as softwood islands in the sea of Eucalyptian and Leguminous hardwood which alone survive on the evaporated hills and plains encompassing them.

Betwixt and between the typical open hardwood forests of Queensland and the dripping jungles where congregate the Silkwoods, the Rose Mahoganies, the Beans and the Silky Oaks, is the great hillside type of the south-eastern quarter of Queensland, the Hoop and Bunya Pine forest, which, ousted from the heavy jungle by the oppression of the full-blooded, heavy, drink-drenched jungle fancywoods, pits itself against the Eucalyptus trees of the scrub edges, battling against their shade, and gradually creeping through their canopy, eventually spreads its young shoulders above the old Ironbarks, and condemns them in turn to gradual decline and death, save when the bush fires descend upon both, and scorching the Hoop and Bunya Pines to the bone leave a borer host behind to finish them off, whilst the old Eucalypts in their greater hardihood defy both flame and worm, and put forth new green leaves, giving challenge for the thousandth time to all the forces of Nature arrayed against them.

On the Forest Front.

This then is the situation from the forest front of Queensland, where the tide of battle of Nature ebbs and flows continually and continuously. Man comes in to settle the fight to his own advantage only to discover that the taproot which the native tree develops against Nature is developed also against him, because it makes it extremely difficult for him to use it as a nursery and plantation ingredient. It refuses to lend itself to planting. Not so the docile treeling of Europe, with its shallow fibrous roots which become more shallow and fibrous under nursery treatment, and make the tree amenable to the forester in the new forest. But man is not to be beaten by a tree, and thus has evolved the Queensland equipment for transcending the taprooting difficulty by encasing the stubborn taproot in a planting cartridge.

Thus the Australian trees are being torpedoed into the forest fight of the future in a twist of tin costing a penny, which can be used over and over again. But that penny's worth took seven years to think out, and the extra-tropical world hasn't thought it out yet.

Overhauling the Deficit.

Hoop and Bunya Pines are our most important trees, providing as they do the main wherewithal for the building of homes for the greater part of our people. But the Hoop and Bunya pine forests occupy only a small quarter of South-eastern Queensland, and are almost indiscernible upon the Queensland map expanse as scattered green specks and smudges. In all they aggregate 1,000,000 acres, and there is left upon them around 1,000,000,000 feet of pine, which we are using up at present at the rate of 60,000,000 feet a year; a sixteen-year resource which, by dint of rationing and dilution, we propose to make serve for up to thirty years, when our first crops of quick-grown species are ripening to the market. Thereafter the local deficit in timber will gradually be overhauled by our plantation programme, which is worked out to provide a constant and normal wood ration for every child to be born or brought to Queensland.

Thus with the help of the unnoticed forest, the homes and businesses of Queensland will prosper, and a larger avenue of activity and service will be opened to the Real Estate Institute of the times to come.

AUSTRALIAN TOBACCO INVESTIGATION.

In August of last year the representative of the British-Australasian Tobacco Company, when giving evidence before the Tariff Board, made an offer on behalf of the company to enter into a definite arrangement with any State Government, or the Federal Government, to spend £1 for £1 up to a total of £50,000 in developing the tobacco-growing industry in Australia.

The Development and Migration Commission and the Council for Scientific and Industrial Research subsequently discussed this offer with the company, with the result that a definite proposal was submitted by the company which even exceeded the terms of its first offer.

The proposal is that over a first period of three years the company will find £20,000 rateably with the sum of £10,000 to be found by the Commonwealth and/or State Governments for the purpose of carrying out investigations and field experiments. Of the £10,000 the Commonwealth Government has agreed to provide £5,000, and it has been suggested that the other £5,000 be found by the Governments of the five mainland States—that is, £1,000 by each of the States for the three-year period.

If, at the expiration of the three-year period, developments are sufficiently encouraging to warrant further effort, and additional expenditure is considered necessary and desirable, the company will provide a further £30,000 conditionally upon the Commonwealth and/or State Governments providing a similar amount, and it is proposed that the five States referred to should contribute £15,000 jointly, or £3,000 each, to cover this second period, and the Commonwealth Government the remaining £15,000.

The Commonwealth Government and all the mainland State Governments have formally agreed to the proposals on the terms outlined.

Under the terms of the agreement, an Executive Committee to control the policy and general direction of this investigation was constituted, and it was agreed that the contributing States should nominate, say, the Directors of Agriculture, or such other officers deemed suitable, to act as an Advisory Committee.

It was a condition of the agreement that the Executive Committee should consist of a representative of the Development and Migration Commission, a representative of the Executive of the Council for Scientific and Industrial Research, and a third member to be jointly appointed by these two bodies.

The Executive now consists of Mr. H. W. Gepp, Chairman of the Development and Migration Commission; Dr. A. C. D. Rivett, Chief Executive Officer of the Council for Scientific and Industrial Research; and Dr. Darnell-Smith, Director of the Botanic Gardens, Sydney, who has had considerable experience on the scientific investigational side of the tobacco industry in Australia. The Executive has also appointed as an additional full member of the Executive the Chairman of the Standing Committee on Agriculture of the Council for Scientific and Industrial Research, who at the present time is Dr. S. S. Cameron, Director of the Victorian Department of Agriculture. It may be mentioned that all the State Departments of Agriculture are representated on this Standing Committee by their permanent heads.

The organisation of the investigation is proceeding as rapidly as possible, and already much work has been done. An economic survey of the present state of the industry is at present being made, and the results of past experiments and experiences in the industry are being closely studied.

The party conducting this survey will visit the various States and interrogate growers; the purpose of the survey, however, is merely to collect information and not to impart advice. The personnel of this party consists of a man from New South Wales and one from Victoria, together with a graduate in agriculture to undertake a general examination of soils.

It is hoped that as a result of the survey much valuable information will be obtained regarding the economic factors of the industry. A study will also be made of the varieties of leaf grown, and those which have proved most profitable, and information will be sought as to the climatic conditions best suited for their production. The nature of the damage, and the extent of the loss resulting from the ravages of blue mould and the methods employed for its prevention, will also be one of the aims of the survey. Information regarding insect pests and the nature of the damage resulting therefrom, and details of the methods employed in the curing, grading, packing, and marketing of the tobacco will also be sought, and the opportunity will be taken during the survey to invite the growers to offer suggestions for the improvement of the industry. The information obtained as a result of this survey—so far as it concerns the individual—will be treated as strictly confidential.

In addition to this economic survey of the industry in Australia, Dr. Darnell-Smith, a member of the Executive, is at present in America studying the tobacco industry in that country. His inquiries will have particular reference to the question of soils and cultural methods.

Applications are being called in Australia and throughout the world for the position of Director of Tobacco Investigations. Applicants should have had a thorough University training (or its equivalent) in plant physiology and pathology, with special experience, in some aspects at least, of tobacco growing and curing. It is not expected that any applicant will possess expert knowledge of every phase of the industry; hence the selection of a supporting staff will be deferred until the Director has been appointed. The salary offered is from £1,500 to £2,000 per annum (with travelling expenses), according to qualifications. The period of appointment will be three years, and the term may be extended.

It would appear, however, judging from letters received by the Executive from growers and from certain published statements, that there is an impression that the purpose of the funds made available under the agreement is to provide some form of subsidy or financial assistance to the industry. The Executive wish it to be clearly understood that such is not the case, and that the purpose of the Australian Tobacco Investigation, as its name implies, is to investigate the problems of the industry with a view to their solution, and so to establish the industry in Australia on a sound and stable basis.

It would appear that the first announcement of the agreement gave a decided fillip to the industry, and many inquiries have been received about the possibility of growing tobacco. It is the considered opinion of the Executive that, until the proper methods and conditions have been determined, an increase of the area at present devoted to tobacco is inadvisable. A rapid expansion of the industry at present would probably lead to much unsuitable land being devoted to tobacco culture, and to the production of much inferior leaf. Those desirous of obtaining information regarding the industry are advised to communicate with their State Department of Agriculture, who will be kept informed of the Executive's researches, and who, in the future as in the past, will continue to be the medium for imparting practical advice to growers.

The Executive is anxious that growers will heartily co-operate with it in the inquiries which it will undertake with a view to improving the conditions of the industry. At the same time, the Executive will take the obviously practical course of consulting, wherever possible and desirable, the various bodies connected with the industry, and already arrangements have been made to take full advantage of the advice and help which existing State tobacco experts, in view of their long experience, are so qualified to give.

The Executive is anxious that the investigation shall be carried out with that unanimity and good will on the part of all concerned which characterised the discussions of the contracting parties to the agreement prior to its final acceptance.

FACTS ABOUT FOOD VALUES.

M. A. WYLIE, Inspectress and Organiser, Domestic Science, Education Department, Western Australia.*

The classification of foodstuffs was given in a previous issue of this magazine, and in the present article I would remind the reader of the oft-mentioned five groups of foodstuffs, viz., proteins, carbohydrates, hydrocarbons, minerals, and other substances sometimes called nutrients or vitamines. Foods from each of these groups help to make meals well balanced and appetising.

Summarising, we may say the work of food is—

(*a*) To build new tissues and repair old ones;
(*b*) To furnish heat and energy for work and play;
(*c*) To regulate the machinery of the body in order to ensure normal growth and health.

The proteins, such as albumens (found in meat, milk, and eggs), are the builders and repairers of tissue. The carbohydrates, such as starchy material and sugars (found in grains and fruits), supply material for the production of energy, whilst hydrocarbons (fats) give warmth, and, under certain conditions, energy. The minerals, such as iron, calcium, and phosphorus, obtained from the outer coats of grains, also from vegetables and fruits, are required for teeth, bones, blood, and

* In the "Journal of Agriculture," W.A., for June.

tissue generally. Vitamines have a large share in keeping up the normal growth and health of the body.

The material called roughage also plays an important part amongst the foods of the body. This is the bulky part supplied along with certain foods, such as the outer coverings of grain, as bran, or the cellulose or framework of leafy vegetables such as cabbage. Roughage helps to keep the food moving in the digestive tract, acting also as a conveyor of food materials. Bran does this as well as providing nutriment in the form of gluten and minerals.

Insufficient food, and food supplied in wrong proportion and variety, have a deleterious effect upon the body, especially upon that of the growing child. The shape and appearance of the body is affected, the mentality more or less weakened, and a general state of debility is the result.

Good nutrition shows itself in well-developed frame, straight back, legs and ankles, strong teeth, clean tongue, sweet breath, firm flesh with healthy colour, sparkling eyes with clear whites, glossy hair, and energetic attitude towards life in general, and a keen appetite for simple food. Proper food selection is therefore something that everybody needs to understand.

In planning meals always make the best possible use of fresh fruits, vegetables, and meats, avoiding the canned variety as much as possible, as the essential vitamines are more or less destroyed in the process of preservation.

To have attractive, pleasing meals it is necessary to plan how different textures and flavours, and sometimes even colours of foods combine. This is not a merely epicurean practice, for we are more likely to eat the right foods if they please eye and nose, and tongue as well. Hence in your meals have foods of different texture: some hard, some soft; some crisp; some juicy. It is good to remember sometimes that the use of left-overs is false economy of health and time, and even of materials, if it requires undue quantities of fresh supplies to make the former palatable.

The quantity of food as well as the quality of food for each person is of paramount importance; the growing child, or rather the adolescent, requires as much as the adult. Those engaged in heavy physical work require more than those of sedentary occupations. Again, temperature alters conditions and needs; cold climates demanding more than warm.

One of the best ways to estimate the quantity of food needed by a person or family is in terms of calories.

There is nothing mysterious about this term; it is simply the unit of measure of heat or fuel value. As the thermometer shows intensity of heat, the calorimeter shows the amount of heat; the first is measured by degrees, the latter by calories.

There are many tables published of the different foods—classified according to their heat or energy-producing value in calories. The following table is culled (and simplified) from the latest American authorities:—

Proteids:

Milk (1 quart) gives 600 calories.
Skimmed milk (1 quart) gives 300 calories.
Beef (1 lb.) gives 1,000 calories.
Poultry (1 lb.) gives 500 calories.
Fish, fresh (1 lb.), gives 200 calories.
Cheese (1 lb.) gives 2,000 calories.

Carbohydrates:

Bread (1 lb.) gives 1,200 calories.
Bread, whole wheat (1 lb.), gives 1,600 calories.
Shredded meal (1 lb.) gives 1,650 calories.
Oatmeal (1 lb.) gives 1,800 calories.

Sugars:

Honey (1 lb.) gives 1,500 calories.
Granulated sugar (1 lb.) gives 1,800 calories.
Milk chocolate (1 lb.) gives 2,250 calories.

Hydrocarbons:

Butter (1 lb.) gives 3,400 calories.
Oil (1 lb.) gives 4,100 calories.
Cream, 40 per cent. (1 lb. or 1 pint), gives 1,700 calories.
Bacon (1 lb.) gives 2,600 calories.
Salt pork (1 lb.) gives 2,850 calories.
Almonds, shelled (1 lb.), gives 2,900 calories.
Walnuts, shelled (1 lb.), gives 3,200 calories.

Vegetables (fresh):

Asparagus (1 lb.) gives 100 calories.
Lima beans (1 lb.) gives 550 calories.
French beans (1 lb.) gives 175 calories.
Beets (1 lb.) gives 150 calories.
Cabbage (1 lb.) gives 100 calories.
Carrots (1 lb.) gives 150 calories.
Cauliflower (1 lb.) gives 150 calories.
Tomatoes (1 lb.) gives 100 calories.
Green peas (1 lb.) gives 250 calories.
Dried peas (1 lb.) gives 1,600 calories.
Potatoes (1 lb.) gives 300 calories.

REPAIRING WOOD FENCES.

Inserting new rails or posts in a fence is a troublesome job. An ordinary farm post and rail with no pales is comparatively easy, and there are ways of putting in a new rail with a minimum loss of time. "Farm, Field, and Fireside" in the accompanying illustration shows means of carrying out this work as expeditiously as possible. For instance, the rough-and-ready way is to fit one end into its corresponding mortise, cut it the right length to go through the mortise at its other extremity, and chop it to an elongated point A (Fig. 1). This end is pushed through its mortise

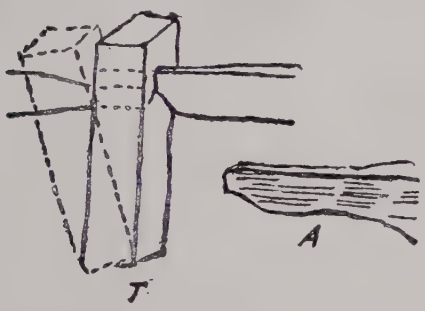


Fig. 1.

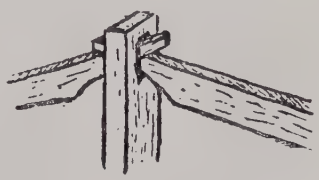


Fig. 2.

far enough to allow the rail to be driven back into its first or original bed. This weakens the rail and has not a good appearance. A better way is to loosen the post and push it back (Fig. 1) until the new rail can be got in; to effect this it may be necessary to ease the mortise somewhat with a chisel. Then the post is set up again.

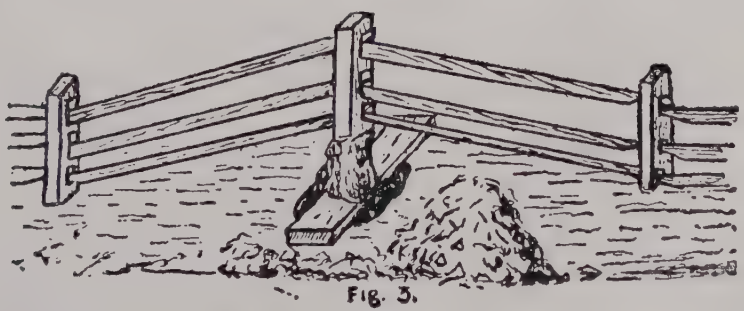


Fig. 3.

A broken post is renewed thus:—The old one is dug out and split to allow the rails to be released. The mortises in the substitute are made a little larger (say ¼ inch each way) than the old ones, and the rails are inserted whilst the post is loose. The latter is then pushed into place and rammed.

Fig. 3 shows a better way. The faulty post is dug out. A plank is laid over the hole, and the new post previously mortised is stood on the plank and the rails are introduced as shown, any casement required being effected with a chisel. The plank is withdrawn and the post sinks into the hole. This method is not likely to split the post when adjusting the rails.

General Notes.

Arrowroot Board.

An Order in Council has been approved empowering the Arrowroot Board to give to the Commonwealth Bank the necessary security required by that bank for financial assistance rendered to the Arrowroot Board from the Rural Credits Branch.

Queensland Cane Growers' Council.

By Regulation under the Primary Producers' Organisation and Marketing Act power has been given to any member of the Queensland Cane Growers' Council, if he be unable to attend any meeting of the council, to appoint a deputy to take his place at such meeting.

Egg Board Levy.

By regulation made under the Primary Producers' Organisation and Marketing Act, His Excellency the Governor has removed the necessity for the Egg Board to obtain the authority of the Treasurer before operating on its Trust Account, into which the proceeds of the Egg Board Levy are paid.

Atherton Tableland Maize Board.

An Order in Council has been issued under the Primary Producers' Organisation and Marketing Act empowering growers of maize to withhold from delivery to the Atherton Tableland Maize Board in any one year not more than 5 tons of the commodity for food for their families and/or live stock and for use as seed.

Broom Millet, Peanut, Cotton, and Egg Boards.

Orders in Council have been approved inserting in previous orders, re the financing of the above Boards by the Commonwealth Bank, a further paragraph. This paragraph provides that any security shall cover future crops of the commodity concerned as well as the crop in existence at the time the security was given.

Cane Levy—Maryborough District.

In previous Regulations issued under the Primary Producers' Organisation and Marketing Act, the Maryborough District Cane Growers' Executive was empowered to make a levy on suppliers to the Mount Bauple Central Mill at the rate of ½d. per ton of cane delivered to that mill. The amount of the levy has now been fixed at the rate of ¾d. per ton. This alteration has been made by an amending regulation.

The Diabolo Separator.

The Diabolo separator is now offered in six sizes, from 10 gallons up to 115 gallons, containing all worthwhile modern improvements. The fact claimed that for many years a greater number of separators has been manufactured in the Diabolo works than in any other separator factory in the world demonstrates its efficiency as part of a modern dairy farm plant. More than 1,000,000 machines of this type have been manufactured, and the yearly output is now 100,000 separators going out to every dairying country in the world. The Australian and New Zealand business shows a continued steady increase. The demand to-day is for higher efficiency in every department of industry, and only those separators that are proved by test to be exhaustive skimmers under everyday dairy conditions can survive on the market. The Diabolo is one of these. An agency has been established in Brisbane, and fuller particulars of their enterprise may be found in our business pages.

Influences of an Agricultural Life.

"No one doubts that our national life would be the poorer by a decline in our rural life; but it is sometimes difficult to state in definite terms the extent of the loss," comments Professor Strong, of the Leeds University. "It is well known, however, that contact with the soil leads to an appreciation of nature and natural phenomena, which it is difficult, if not impossible, to obtain in any other way," he adds. "History and literature and art have shown throughout the ages that daily contact with the elemental forces of nature breeds independence of character, virility of mind, constancy of purpose—qualities included among those accounted worth while in life. And if perchance at times these are allied with other and less desirable accompaniments, the latter, more often than not, are attributable to causes which a well-organised national life could remove or control."

Mackay Sugar Levies.

Regulations were approved on the 23rd July empowering the various District Canegrowers' Executives to make levies on sugar-growers in Queensland. The levy to be paid by suppliers to the Mackay sugar mills was approved to be at the rate of 2d. per ton of cane delivered, but the Regulations have now been amended providing that the levy, in so far as the Mackay mills are concerned, shall be at the rate of 1d. per ton of cane delivered.

Levies by Sugar Mill Suppliers' Committees.

The following Mill Suppliers' Committees have been empowered, by Regulation, to make levies at the rates mentioned opposite the names of such Committees:—

Hambledon Mill Suppliers' Committee—one farthing;
Pleystowe Mill Suppliers' Committee—one penny;
Tully Mill Suppliers' Committee—one farthing

per ton of cane delivered to the Hambledon, Pleystowe, and Tully Mills respectively, during the season commencing 1st May, 1927, and ending on 28th February, 1928. Provision is made, however, for the taking of polls in connection with such levies, if demand for such polls is made by at least eighty growers concerned. The amounts of the levies shall be used as follows:—In the case of Hambledon, for the purpose of defraying administrative expenses of the Hambledon Mill Suppliers Association; in the case of Pleystowe, for the purpose of defraying expense of a check weighman; and, in the case of Tully, for administrative and other minor expenses of the Mill Suppliers' Committee.

Wheat Board Election.

Nominations for the election of five members to the State Wheat Board:

District No. 1.—(1921 Electorates of Maranoa, Dalby, Nanango, and Murilla, with the exception of the Goondiwindi Division), Robert Swan, Wallumbilla (returned unopposed).

District No. 2.—1921 Electorate of Pittsworth), Arthur Carl Krieg, Brookstead (returned unopposed).

District No. 3.—(1921 Electorates of Warwick, Carnarvon, and the Goondiwindi Division of Murilla, and the Warwick and Killarney Divisions of the Cunningham Electorate), Alexander N. Allen, Campbell's Plains; Bergittinus C. C. Kirkegaard, Freestone.

District No. 4.—(1921 Electorate of Cunningham, with the exception of the Warwick and Killarney Divisions), Thomas Muir (returned unopposed).

District No. 5.—(Old Electorates of Lockyer, Drayton, Aubigny, Toowoomba, and East Toowoomba), John Archibald, Oakey; Patrick McNee, Kingsthorpe.

Proposed Honey Pool.

A poll to decide the question of the constitution of a Honey Pool, to include all owners of five hives of bees and over, was taken at the Department of Agriculture and Stock, Brisbane, recently, with the following results:—

For the setting up of a Honey Board .. 171 votes (55.5 per cent.)
Against the setting up of a Honey Board 137 votes

As the necessary two-thirds majority was not secured, the proposal was therefore defeated.

Alternative proposals for a poll to comprise only owners of fifteen hives of bees and over, and thirty hives of bees and over, respectively, were also submitted to growers, and in both cases the necessary majority was not obtained.

The voting of the proposals was as follows:—

Owners of fifteen hives of bees and over.

For the setting up of a Honey Board .. 128 votes (59.5 per cent.)
Against the setting up of a Honey Board 87 votes

Owners of thirty hives of bees and over.

For the setting up of a Honey Board .. 86 votes (60.5 per cent.)
Against the setting up of a Honey Board 56 votes

Proposed Queensland Maize Board.

The counting of votes in connection with the proposed Maize Board was conducted at that Department on 6th August, with the following results:—

For the setting up of a Maize Board	..	1,924 votes (37.4 per cent.)
Against the setting up of a Maize Board	..	3,225 votes (62.6 per cent.)
Informal and incomplete	..	115 votes
		5,264 votes

The details of the voting on this question are given hereunder:—

District.	For.	Against.	Total.	Informal and Incomplete.
No. 1 (Moreton)—5,847 growers	405	1,448 78·1 per cent. against	1,853	37
No. 2 (Darling Downs and Maranoa)—4,880 growers	738	1,492 66·9 per cent. against	2,230	49
No. 3 (Rest of Queensland, except Atherton District) 4,113 growers	781	285 73·2 per cent for	1,066	29
	1,924	3,225	5,149	115

Mr. C. Sheehy, of the Council of Agriculture, and Mr. F. T. Keable, of Tammymorel, were present at the counting of the votes.

The Royal Society of Queensland.

The ordinary monthly meeting of the society was held in the Geology Lecture Theatre on Monday, 28th July.

The President (Professor E. J. Goddard) was in the chair.

The President referred to the death of Dr. Taylor, a trustee of the society, and extended sympathy to his relatives.

The President announced that the society had been represented on a deputation in connection with the proposed open season for native bears, and that there was no need for further action on the matter at this meeting.

Dr. F. W. Whitehouse exhibited a collection of carboniferous corals from the Lion Creek Limestone, near Stanwell. These included *Syringopora syrinx* Eth. fil., *sp. nov.*, **Michelinia sp.*, **Palaeosmilia retiformis* (Eth. fil.), *Amygdalophyllum inopinatum* (Eth. fil.), *Lithostrotion columnare* (Eth. fil.), and **Petalaxis sp. nov.*, the species marked with an asterisk being new records. He suggested that the coral limestones interbedded in the Lower Carboniferous mudstones at many localities in Eastern Australia were all on much the same horizon, that horizon being the equivalent of D_2 in the European zonal succession.

Dr. W. H. Bryan read a paper by Professor H. C. Richards and himself entitled "Volcanic Mud Balls in the Brisbane Tuff." The paper dealt with a very unusual form of volcanic ejecta in the form of spheroidal pellets of concentric structure found by the authors at Castra, on the Tingalpa Creek, 12 miles east-south-east of Brisbane. The only closely similar volcanic product seems to have been formed by the eruption of Taal Volcano in the Philippine Islands in 1911. This was described by Pratt, whose explanation of the spheroids as the result of condensation of the mud balls above the volcano in much the same manner as in the formation of summer hail. Professor Richards added some comments on the paper, which was discussed by Drs. E. O. Marks and F. W. Whitehouse, Messrs. Dormer, Tommerup, Herbert, Denmead, Morwood, Professor Parnell, and the President.

Professor Parnell then took the chair, and a lecture on "Bunchy Top of the Banana," illustrated by specimens and lantern slides, was delivered by Professor Goddard. He dealt with the history of the disease in Australia from its introduction from Fiji to the present, described the symptoms, methods of investigation of the problem, and the treatment. It was pointed out that all members of the genus *Musa* are susceptible, including the wild bananas of North Queensland. A vote of thanks to the lecturer was moved by Mr. Longman and seconded by Professor Richards, but, owing to the lateness of the hour, no discussion of the paper took place.

Fish and Mosquito Control.

Success of experiments to exterminate malaria mosquitoes in Italy and Spain by the use of an American fish called "gambusia" introduced into those countries, is reported by the Bureau of Fisheries, of the Department of Commerce, U.S.A.

The experiment was attempted several years ago, when a shipment of gambusia was made from the United States to Europe to wage war against malaria mosquitoes in certain parts of Italy and Spain.

The original shipment of fish was sent to Spain, from which a number were sent to Italy. Their activities against the mosquito in that country were so successful that the gambusia have now been distributed over many parts of Italy, and have been introduced from that country, either directly or indirectly, into Germany, Russia, and Yugoslavia.

The original shipment of gambusia was placed in a pond in Spain, where they multiplied very rapidly. A year after their introduction in that country, several hundred were placed in the Lago di Porto, in Italy, a body of water which had been swarming with mosquito larvæ. It is said that a specimen of this larvæ is now rarely seen about the lake.

It is stated by an Italian scientist that complete mosquito control is obtainable with gambusia if there is complete control of vegetation in the infested region. Vertical vegetation, he said, leaves to gambusia the possibility of complete destruction, while horizontal vegetation often prevents efficient control. The reduction to a minimum of mosquito breeding without the use of a drop of petroleum is reported for extensive areas in Italy, a result never before obtained.

Staff Changes and Appointments.

Mr. J. C. Lamont has been appointed Trappers' Representative on the Moreton Opossum Board during the absence of Mr. G. W. Martens.

Mr. R. Veitch, Entomologist in Chief, Mr. J. H. Simmonds, Plant Pathologist, and Mr. A. A. Girault, Assistant Entomologist, have been appointed Inspectors under the Diseases in Plants Acts.

Mr. J. Bishop, of Beaudesert, has been appointed Inspector of Stock, and will be stationed at Ravensbourne.

Messrs. L. D. Carey and R. J. T. Kidd, Inspectors of Stock at Emerald and Mackay, respectively, have been appointed Collectors of Royalty in connection with the Animals and Birds Acts, *vice* Messrs. E. J. Tannock and S. J. Monaghan respectively, transferred.

Mr. Norman James, of Cedar Creek, has been appointed an Honorary Inspector under the Diseases in Plants Acts.

Mr. P. Kirwan, of Mackay, has been appointed Cane Growers' Representative on the Farleigh Local Sugar Cane Prices Board, vice Mr. A. S. Hamilton, resigned.

The following have been appointed Officers under and for the purposes of the Animals and Birds Acts:—

P. Rumball, Poultry Instructor, Department of Agriculture and Stock, Brisbane;

John Archer, Malchi;

E. C. House, Torilla Station;

M. P. Mallon; and

P. J. Ryan, of Dugandan Homestead, Boonah.

The services of Mr. J. C. Pryde, as Temporary Inspector of Stock, Toowoomba, have been continued from 13th August, 1927, to 20th September, 1927.

Mr. N. C. Copeman, of Toowoomba, has been appointed an Inspector of Stock.

The Officer in Charge of Police, Dalby, has been appointed Acting Inspector of Stock at Dalby.

Mr. A. E. Pascoe, of Yeppoon, has been appointed Honorary Inspector, Diseases in Plants Acts.

Messrs. H. Walker (Mount Glorious) and A. G. Maddox (Tarome, viâ Kalbar) have been appointed Officers under and for the purposes of the Animals and Birds Acts.

Mr. G. A. Currie, Assistant Entomologist, Cotton Section, previously attached to the Callide Cotton Research Farm, Biloela, has been transferred to Brisbane.

Mr. S. M. Watson, Assistant to Entomologist, at present attached to Brisbane, will be transferred to Stanthorpe, as from the 13th August, 1927.

Sugar Mill Suppliers' Committees.

Approval has been given to the Queensland Cane Growers' Council to appoint the following members to complete the representation of the Mill Suppliers' Committees below mentioned:—

Maryborough Mill Suppliers' Committee, J. C. Kinbacker, Bidwell, via Maryborough;

Bingera Mill Suppliers' Committee, Mr. O. Peterson, Pine Creek, Electra, Bundaberg;

North Eton Mill Suppliers' Committee, Mr. C. H. C. Ross, Eton, Mackay, Mr. W. Leeson, Eton, Mackay;

Cattle Creek Mill Suppliers' Committee, Mr. T. Etwell, Kowari Siding, Hatton Line, Mackay; and

Hambledon Mill Suppliers' Committee, Mr. W. Thompson, Edmonton, via Cairns.

Sugar Mill Suppliers' Committees Regulation Rescinded.

Regulation 125 under the Primary Producers' Organisation and Marketing Act with regard to the official roll for the purpose of election of Mill Suppliers' Committees and District Cane Growers' Executives has been rescinded, and for Regulation 125 the new Regulation provides that the official roll for the purpose of the election shall embody—

(*a*) The latest roll of suppliers to each mill as obtained from the Central Sugar Cane Prices Board;

(*b*) A supplementary roll compiled by the mill and certified to by the Secretary of the Mill Suppliers' Committee;

(*c*) The name of any person whose name is not included in (*a*) or (*b*) who forwards a statutory declaration that he has an area of not less than five acres of cane, and is a bona fide supplier to the named mill.

Sugar Levies.

By regulations made under the Primary Producers' Organisation and Marketing Act, the Queensland Cane Growers' Council has been empowered to make a levy at the rate of ¾d. per ton of cane harvested during the season ending on the 29th February, 1928. This levy will be utilised for administrative purposes.

The Cane Growers' Council is also empowered to make a further levy at the rate of 1d. per ton of cane harvested during the season ending on the 29th February, 1928, such levy to be utilised for the purpose of creating an advance fund for the sugar industry. Provision is made, however, for a poll to be taken as to whether the levy shall be made if a request for such a poll is made by at least 100 growers of sugar-cane on or before the 23rd August, 1927.

All District Cane Growers' Executives constituted under the Queensland Cane Growers' Council are also empowered by these Regulations to make levies on growers of sugar-cane supplying cane to the mills represented on such Cane Growers' Executives, such levies to be expended only in the interests of District Executives and Mill Suppliers' Committees for administrative purposes, in the supply of stationery, stamps, &c., and other minor incidental expenditure. These levies range from ¼d. to 2½d. per ton of cane supplied.

Provision is made for the taking of a poll on the question as to whether any of these levies shall be made. In addition to the levies by District Cane Growers' Executives, the Bundaberg District Cane Growers' Executive is empowered to make a levy at the rate of 1d. per ton of cane delivered by the Booyal Branch of the Isis Central Mill Suppliers' Committee, and a levy at the rate of 1½d. per ton of cane delivered by the Pialba District Branch of the Isis Central Mill Suppliers' Committee to the Isis Central Mill, the amount of such levies to be respectively expended only in the interests of the branches for the purpose of financing the local organisation work, payments for hire of halls, &c.

The Southern District Cane Growers' Executive is also empowered to make an additional levy at the rate of 1¼d. per ton of cane delivered to the Moreton Central Mill and ¼d. per ton of cane delivered to the Rocky Point Mill, the proceeds of such levies respectively to be used for the purposes only of the Moreton Mill Suppliers' and the Rocky Point Mill Suppliers' Committees. Polls may also be taken in connection with these additional levies.

Department of Agriculture and Stock,
Brisbane, 1st September, 1927.

HIS Excellency the Governor, with the advice of the Executive Council, has, in pursuance of the provisions of *"The Primary Producers' Organisation and Marketing Act of* 1926," been pleased to make additional Regulations to the following effect.

W. FORGAN SMITH.

Cotton Board Levy.

184. Subject to the following proviso, the Cotton Board is hereby empowered to make on all growers delivering seed cotton to ginneries a particular levy at the rate of ½d. per lb. of cotton so delivered as from 1st January, 1927, to 31st December, 1931, provided that if at least 100 growers of cotton who delivered seed cotton to ginneries during the years 1926 or 1927, on or before the third day of October, 1927, make, in writing to the Minister, a request for a poll on the question of the levy proposed to be made in respect of the cotton so delivered, a poll of such growers shall be held by the Under Secretary, Department of Agriculture and Stock, and, if upon such poll the majority of votes is against the making of such levy, such levy shall not be made.

185. The amount of such levy shall be deducted by the Cotton Board from payments due by that Board to cotton-growers as above described, and shall be paid by the manager of such Board into a Capital Fund, to be expended only in effecting any object which may be in the common interest of cotton-growers determined by the Cotton Board.

186. Any person who commits a breach of either of the above Regulations (Nos. 184 and 185) shall be guilty of an offence, and shall be liable to a penalty not exceeding five pounds.

Department of Agriculture and Stock,
Brisbane, 1st September, 1927.

HIS Excellency the Governor, with the advice of the Executive Council, has, in pursuance of the provisions of *"The Primary Producers' Organisation and Marketing Act of* 1926," been pleased to make additional Regulations to the following effect.

W. FORGAN SMITH.

Mossman Mill Levy.

180. Subject to the following proviso, the Mossman Mill Suppliers' Committee is hereby empowered to make particular levies on primary producers in the sugar-growing industry and operations in the following locality, that is to say:—

The lands assigned to the Mossman Mill under *"The Regulation of Sugar Cane Prices Acts,* 1915 *to* 1922"—

at the following rate, that is to say:—

Fourpence per ton on all sugar-cane delivered from the locality above referred to—

during the period commencing 1st May, 1927, and ending on the 29th February, 1928: Provided that if at least seventy primary producers in such industry and operations as aforesaid in the locality constituted by the lands assigned to the

Mossman Mill on or before the Twenty-seventh day of September, 1927, make, in writing to the Minister, a request for a poll on the question of the levy proposed to be made in respect of the sugar-cane delivered at such mill, a poll of all primary producers in such industry and operations as aforesaid in the said locality shall be held by the Under Secretary of the Department of Agriculture and Stock, and if upon such poll the majority of votes is against the making of such levy, such levy shall not be made.

181. The amount of every such levy shall be deducted by the manager of the Mossman Mill from the cane payments due by such mill to sugar-cane growers in the locality constituted by the lands assigned to such mill, and shall be paid by the said manager to the Secretary of the Mossman Mill Suppliers' Committee, which shall utilise same for administrative purposes in connection with the conduct of an office and payment of a Secretary and Paymaster for the harvesting of the cane of suppliers to the Mossman Mill. The amount of such levy shall be deducted from all cane supplied during the preceding month, and shall be paid not later than the fifteenth day of the succeeding month.

182. The Secretary of the Mossman Sugar Mill Suppliers' Committee shall furnish to the Minister, not later than the 31st March, 1928, an audited statement setting out in detail the receipts from such levy and the disbursements therefrom.

183. Any person who commits a breach of any of these Regulations (Nos. 180 to 182 inclusive) shall be guilty of an offence, and be liable to a penalty not exceeding five pounds.

A GARDEN STILE.

This illustration depicts a stile suitable for placing over fences adjoining home paddocks. Hard or soft wood, 3 inches x 1½ inch, would be suitable for the sides, 3 inches x ¾ inch for the steps, and 6 inches x 1 inch for the top. The height of the stile should be sufficient to clear the top wire of the fence. The cross stays to keep the legs from spreading should be made of 3 inches x 1 inch hardwood, and the whole

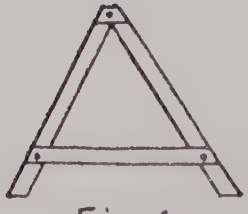


Fig. 1.

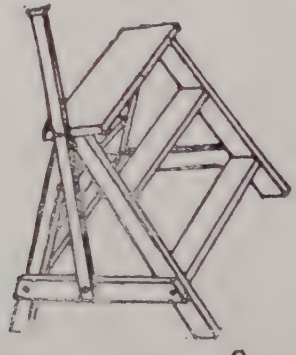


Fig. 2.

structure will be strengthened if these are fastened through by long ½-inch bolts. These must be put on after the stile has been placed in position. The width of the stile may be 18 inches to 2 feet. An upright of 2 inches x 1 inch projecting 2 feet 6 inches above the top serves as a hand rail. Planed timber should be used, and finished with two coats of white paint.—"Australasian."

Banana Plant Prohibition applied to Goomboorian

A Proclamation has been issued under the Diseases in Plants Acts prohibiting the introduction of banana plants into the Goomboorian district.

The Three D's.

Three things are mainly responsible for the prolific breeding of bacteria in the milking shed, those being dirt, damp, and darkness. Often with little expense the necessary alteration can be made, and sunlight made available for purifying the shed. So great is the value of sunlight that many medical men advocate the sunbathing of wounds as a destroyer of germs and as a curative agent. What sunlight can do in the killing of bacteria in wounds it can do in slaying their fellows in your milking shed. The concrete-floored shed, kept scrupulously clean, open to the sunlight, will be the shed from which the cleanest supplies of the factory are drawn.

Butter Board Election.

Following is the result of the ballot for a Northern Representative on the Butter Board:—

William James Sloan (Malanda)	166 votes
Walter Scott (Peeramon)	131 votes
Wilfred Alexander Johnston (Ravenshoe)	75 votes
James Reed (Malanda)	47 votes
Informal	4 votes

Mr. Sloan will, therefore, be appointed, and will hold office until the 18th February, 1928.

If you like this issue of the Journal, kindly bring it under the notice of a neighbour who is not already a subscriber. To the man on the land it is free. All that he is asked to do is to complete the Order Form on another page and send it to the Under Secretary, Department of Agriculture and Stock, together with a shilling postal note, or its value in postage stamps, to cover postage for twelve months.

Erection and Care of Farm Buildings.

At a recent farmers' meeting at Beetaloo Valley, South Australia, a local farmer, Mr. H. C. Cook, read a paper on this subject. The buildings, he said, had a very important bearing, both mentally and physically, on the lives of the people on the farm. Care should be taken to erect them in convenient positions, and have them of useful design, when unnecessary work would be avoided. In designing the house, most attention should be given to comfort. In most districts there should be as much veranda as possible around the house to protect the walls from rain and sun. Particular attention should be given to the kitchen and washhouse. A pantry and bathhouse should be included, if possible, also a cellar and underground tank. He also advised farmers to use septic tanks; they gave complete satisfaction and would last a lifetime. The implement shed should be constructed of stone with an iron roof. The roof should be as high as possible, and the shed would then be much cooler during the summer months. The blacksmith's shop could be placed under the same roof. The stable should have stone walls with a straw roof. Cement concrete should be used for the floor of the chaffhouse. He would also arrange to have a circular saw work off the same engine as the chaffcutter, and construct a small shed in which to keep the firewood. Galvanised iron could be used for the protection of hay against mice. Concrete, with timber along the top, could also be used for the same purpose. The cowshed should be separate from the horse yards, and should consist of a spacious yard and comfortable shed. The pigsty should also have a large run and dry shed which was easy to clean, and should be placed at a distance from the house. The barn should be mice and rat proof. If it was built of stone it should be flushed with cement and have a concrete floor. It could also be made rat-proof outside by placing timber around the walls near the roof, with a 6-in. flange of galvanised iron on top. A window or two could be built above the timber. A good discussion followed.

Cheese Board Election.

Cheese Board Election results—

	Votes.
Henry Thomas Anderson, Biddeston	628
William Thomas Harris, Toowoomba	523
David Gabriel O'Shea, Southbrook	502
Alfred John Harvey, Pittsworth	468
George Burton, Cambooya	395
Mads Peter Hansen, Malling, Maclagan	387
William Dearling, Oakey	378
Albert George Tilley, Rosehill, S. and W. Railway	363
Thomas Dare, Woodleigh	295

The first five, together with the Director of Marketing, will therefore be appointed, and they will hold office throughout the term of the Board, which is for a period of three years as from the 1st August, 1927. Should any vacancy occur in the elected members of the Board it is to be filled by election by the growers, and the person so elected will hold office until the expiration of the term for which his predecessor would have held office.

Safety in Silage.

Every wheat-grower should keep a flock of sheep to assist in the effective working of the farm. The number of sheep carried will depend upon the country and the locality, but to carry the maximum number he should put down two or more 100-ton pits of silage—either wheat, oats, or barley can be used. If this is done it greatly assists in the economical working of the farm; and sufficient sheep can always be carried to make use of the stubble and rubbish growing on the fallows without the necessity for keeping a large area of grass as a reserve in case of a drought year.

The making of silage can be fitted into the operations on a wheat farm without interfering unduly with the production of hay or grain. When it is intended to produce either hay or grain, seed must be sown at such a time as will ensure that the crop will be ready to harvest when the weather is suitable for the purpose; it would be disastrous to sow too early. Silage, however, may be made equally as well in June as in October, or in any other month; and thus crops intended for silage may be sown before the hay or grain crop, and cut and pitted before haymaking is commenced.

Under present conditions, it is hardly possible for many wheat-farmers to carry more than a few sheep profitably, as the natural grasses of their holdings are not sufficient, even when helped by the wheat stubble, to provide feed for any length of time. There is no great inducement for a farmer to grow crops specially for feed when he knows that he will have to wait until the crops are ready before he can buy; and that he will then have to pay such a high price, because of the number of other farmers in the same position, that he will not be recompensed for the cost of growing the crop.

It is undeniable that a better system of rotation is required in the wheat areas of this State (N.S.W.) than the almost universal wheat and bare fallow. Sound as the practice of fallowing is, the adoption of it as the sole rotation with wheat will, within a very few years, so reduce the supply of humus in the soil that the yields of wheat will no longer be profitable. Such a condition is already arising in many soils, and will become more pronounced as time passes. In this country, where the rainfall is so uncertain, one of the most important constituents of the soil is humus; because it is one of the prime factors in helping the soil to retain moisture for a long period, and even the best fallowing will not yield good results in its absence.

The only practical means of restoring or maintaining a good supply of this invaluable constituent, other than allowing the land to lie out in grass for a long period, is to grow upon it, in rotation with wheat, a crop which can be fed down by sheep. The remains of the plants left by the sheep, and their excrement, become humus, and thus give to the soil the desirable moisture-retaining character.

The conservation of silage will enable the farmer to adopt such a rotation with greater certainty that he will make a good direct profit from his green crops, and also a larger indirect one, because he will be in the position of being able to stock his land to its full capacity. Unless a reserve of fodder is held it is unsafe to increase his flock, as the green crops may fail to grow at the expected time, owing to the absence of rain.

Moreover, a full silage pit enables him to lamb his ewes with certainty. Should a dry season threaten at the mating time, he need not be afraid to join the rams in the usual way.—A. and P. Notes, N.S.W. Dept. Ag.

Answers to Correspondents.

BOTANY.

Selections from the outward mail of the Government Botanist, Mr. C. T. White, F.L.S., which are of general interest.

Mangroves.

A.M., Sydney, N.S.W.

The negatives of Bruguiera and Ceriops returned by you came safely to hand. I am glad they proved of service to you. Many thanks for the slide of *Rhizophora mucronata* from the negative taken by Allan McCulloch. I got a splendid photograph the other day of Ægiceras showing the root system, but this, I understand, you already have. One can see all these and other mangroves within a few miles of Brisbane. I am collecting photographs with the idea of publishing an article on the mangrove flora of Moreton Bay.

Specimens Identified.

Inquirer, Brisbane—

The specimens from Atherton were very fragmentary; but, as far as the material allows, have been determined as follows:—

No. 1.—Leaves only. Impossible to determine.

No. 2.—*Stenocarpus reticulatus.*

No. 4.—*Darlingia ferruginea.* This tree is only known botanically from the leaves. It would be most interesting to obtain complete material—flowers and fruit.

No. 5.—*Cupania serrata* (?). Family *Sapindaceæ.*

The specimens collected by Forest Assistant Rankin at Yarraman have been determined as follows:—

84.—*Bursaria incana.*

85.—*Acronychia lævis* var. *purpurea.*

86.—*Eucalyptus eugenioides.* White stringy-bark.

87.—*Elæodendron australe.*

88.—*Celastrus australis.*

89.—*Sicyos angulata.*

90.—*Acacia glaucocarpa.*

91.—*Acacia Cunninghamii.*

92.—*Nephelium connatum.*

93.—*Canthium latifolium.*

94.—*Canthium buxifolium.*

Farm and Garden Notes for October.

Field.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, cowpeas, sorghums, millet, panicums, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, tumeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred.

Kitchen Garden.—Our notes for this month will not vary much from those for September. Sowings may be made of most vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 feet apart with 18 inches between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn

and worthless. Thin out melon and cucumber plants. Spraying for fungoid diseases should be attended to, particularly all members of the *Cucurbitaceæ* and *Solanum* families, of which melons and tomatoes are representative examples. Give plenty of water and mulch tomatoes planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant tuberose, crinum, ismene, amaryllis, pancratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphis, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

Orchard Notes for October.

THE COASTAL DISTRICTS.

October is frequently a dry month over the greater part of Queensland, consequently the advice that has been given in the notes for August and September regarding the necessity of thorough cultivation to retain moisture is again emphasised, as, unless there is an adequate supply of moisture in the soil to meet the trees' requirements, the coming season's crop will be jeopardised, as the young fruit will fail to set.

Thorough cultivation of all orchards, vineyards, and plantations is therefore imperative if the weather is dry, as the soil must be kept in a state of perfect tilth, and no weeds of any kind must be allowed to grow, as they only act as pumps to draw out the moisture from the soil that is required by the trees or fruit-yielding plants. Should the trees show the slightest sign of the want of moisture, they should be given a thorough irrigation if there is any available means of doing so, as it is unwise to allow any fruit trees to suffer for want of water if there is a possibility of their being supplied with same. Intermittent growth, resulting from the tree or plant being well supplied with moisture at one time and starved at another, results in serious damage, as the vitality is lessened and the tree or plant is not so well able to ward off disease. A strong, healthy, vigorous tree is frequently able to resist disease, whereas when it has become debilitated through neglect, lack of moisture or plant food, it becomes an easy prey to many pests. If an irrigation is given, see that it is a good one and that the ground is soaked; a mere surface watering is often more or less injurious, as it is apt to encourage a false growth which will not last, and also to bring the feeding roots to the surface, where they are not required, as they only die out with a dry spell and are in the way of cultivation. Irrigation should always be followed by cultivation, so as to prevent surface evaporation and thus retain the moisture in the soil.

All newly planted trees should be carefully attended to, and if they show the slightest sign of scale insects or other pests they should receive attention at once. All growth not necessary to form the future tree should be removed, such as any growths on the main stem or main branches that are not required, as if this is done now it will not only save work later on, but will tend to throw the whole strength of the tree into the production of those limbs that will form the permanent framework of the tree. In older trees all water sprouts or other similar unnecessary growths should be removed.

Keep a good lookout for scales hatching out, and treat them before they have become firmly established and are coated with their protective covering, as they are very easily killed in their early stages, and consequently much weaker sprays can be used. The best remedies to use for young scales hatching out are those that kill the insects by coming in contact with them, such as miscible oils, which can be applied at a strength of 1 part of oil in 40 parts of spraying material and will do more good than a winter spray of double the strength. In the use of miscible oils or kerosene emulsion, always follow the directions given for the use of these spraying

materials, and never apply them to evergreen trees when they are showing signs of distress resulting from a lack of moisture in the soil, as they are then likely to injure the tree, whereas if the tree is in vigorous growth they will do no harm whatever.

All leaf-eating insects should be kept in check by the use of an arsenate of lead spray, taking care to apply it as soon as the damage appears, and not to wait till the crop is ruined. Crops, such as all kinds of cucurbitious plants, tomatoes, and potatoes are often seriously injured by these insects, and the loss occasioned thereby can be prevented by spraying in time. In the case of tomatoes and potatoes, a combined spray of Bordeaux or Burgundy mixture and arsenate of lead should be used, as it will serve the dual purpose of destroying leaf-eating insects and of protecting the plants from the attack of Irish blight.

Grape vines require careful attention, and, if not already sprayed with Bordeaux mixture, no time should be lost in applying this material, as the only reliable method of checking such diseases as anthracnose or black spot and downy mildew is to protect the wood and foliage from the attack of these diseases by providing a spray covering that will destroy any spores that may come in contact with them. The planting of bananas and pineapples can be continued during this month. See that the land is properly prepared and that good healthy suckers only are used. Keep the plantations well worked, and allow no weed growth. Keep a very careful lookout for fruit flies; destroy every mature insect you can, and gather and destroy every fallen fruit. If this is done systematically by all growers early in the season, the subsequent crop of flies will be very materially decreased. See that all fruit sent to market during the month is carefully handled, properly graded, and well packed—not topped, but that the sample right through the case or lot is the same as that of the exposed surface.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS

Much of the matter contained under the heading of "The Coast Districts" applies equally to these parts of the State, as on the spring treatment that the orchard and vineyard receives the succeeding crop of fruit is very largely dependent. All orchards and vineyards must be kept in a state of perfect tilth, and no weed growth of any kind should be allowed. In the Western districts, irrigation should be given whenever necessary, but growers should not depend on irrigation alone, but should combine it with the thorough cultivation of the land so as to form and keep a fine soil mulch that will prevent surface evaporation.

All newly planted trees should be carefully looked after and only permitted to grow the branches required to form the future tree. All others should be removed as soon as they make their appearance. If there is any sign of woolly aphis, peach aphis, or scale insects, or of any fungus diseases on the young trees, these diseases should be dealt with at once by the use of such remedies as black leaf forty, Bordeaux mixture, or a weak oil emulsion. In older trees, similar pests should be systematically fought, as if kept in check at the beginning of the season the crop of fruit will not suffer to any appreciable extent. Where brown rot has been present in previous years, two or more sprayings with Bordeaux mixture can be tried, as they will tend to check other fungus growths, but at the same time the sodium or potassium sulphide sprays are more effectual for this particular disease and should be used in preference when the fruit is nearly full grown. All pear, apple, and quince trees should be sprayed with arsenate of lead—first when the blossom is falling, and at intervals of about three weeks. Spraying for codlin moth is compulsory in the fruit district of Stanthorpe, and wherever pomaceous fruit are grown it must be attended to if this insect is to be kept in check.

In the warmer parts a careful check should be kept for any appearance of the fruit fly, and, should it be found, every effort should be made to trap the mature insect and to gather and destroy any affected fruit. If this is done, there is a good chance of saving the earlier ripening summer fruits, if not the bulk of the crop. Tomato and potato crops will require spraying with Bordeaux mixture, as also will grape vines. Keep a very strict watch on all grape vines, and, if they have not already been treated, don't delay a day in spraying if any sign of an oil spot, the first indication of downy mildew, appears on the top surface of the leaf. Spraying with Bordeaux mixture at once, and following the first spraying up with subsequent sprayings, if necessary, will save the crop, but if this is not done and the season is favourable for the development of the particular fungus causing this disease, growers can rest assured that their grape crop won't take long to harvest.

Where new vineyards have been planted, spraying is also very necessary, as if this is not done the young leaves and growth are apt to be so badly affected that the plant dies.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

1927.	SEPT.		OCTOBER.		MOONRISE. SEPT.	MOONRISE. OCT.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	a.m.
1	6.8	5.36	5.34	5.50	8.56	8.36
2	6.7	5.36	5.33	5.51	9.26	9.15
3	6.6	5.37	5.32	5.52	10.0	10.1
4	6.5	5.37	5.31	5.52	10.38	10.53
5	6.4	5.38	5.29	5.53	11.20 p.m.	11.49 p.m.
6	6.2	5.38	5.28	5.53	12.9	12.48
7	6.1	5.39	5.27	5.54	1.4	1.53
8	6.0	5.40	5.25	5.54	2.4	2.59
9	5.59	5.40	5.24	5.55	3.7	4.6
10	5.58	5.41	5.23	5.55	3.15	5.13
11	5.57	5.41	5.22	5.55	5.22	6.21
12	5.56	5.42	5.22	5.56	6.29	7.30
13	5.54	5.43	5.21	5.56	7.36	8.38
14	5.53	5.43	5.20	5.57	8.42	9.46
15	5.52	5.44	5.19	5.57	9.49	10.15
16	5.51	5.44	5.18	5.58	10.55	11.51
17	5.50	5.45	5.17	5.59	12.0	...
18	5.48	5.45	5.16	5.59	... a.m.	12.46 a.m.
19	5.47	5.46	5.14	6.0	1.1	1.36
20	5.46	5.46	5.13	6.1	1.58	2.18
21	5.45	5.46	5.12	6.1	2.50	2.56
22	5.44	5.47	5.11	6.2	3.36	3.29
23	5.43	5.47	5.10	6.2	4.17	4.0
24	5.42	5.47	5.9	6.3	4.53	4.30
25	5.41	5.47	5.8	6.4	5.25	4.59
26	5.40	5.48	5.7	6.4	5.57	5.30
27	5.38	5.48	5.7	6.5	6.27	6.2
28	5.37	5.48	5.6	6.6	6.56	6.36
29	5.36	5.49	5.5	6.6	7.27	7.14
30	5.35	5.49	5.4	6.7	8.0	7.56
31			5.4	6.8		8.48

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

4 Sept.	☾	First Quarter	8	44 p.m.
12 „	○	Full Moon	10	53 a.m.
18 „	☽	Last Quarter	1	29 p.m.
26 „	●	New Moon	8	10 a.m.

Perigee 13th September, at 3 42 a.m.
Apogee 28th September, at 9 6 a.m.

At the beginning of this month the Southern Cross will be prone, lying on its right side 30 degrees west of the South Celestial Pole, at about 8 p.m. Mercury will be in superior conjunction with the Sun on the 2nd, that is, on the far side of its orbit, almost behind the Sun. Towards the end of the month it will be well above the horizon after sunset, but not well situated for observation.

On the 4th there will be an occultation of Saturn by the Moon at 2.27 a.m., or nearly three hours after they have set.

On the 10th Venus will be in inferior conjunction with the Sun on the side of its orbit nearest to the earth and only about 25 million miles from it. It will be lost in the rays of the Sun, with its bright side away from the earth, but not in a direct line with it, being about 8 degrees southward.

On the 11th Psi Aquarii will be occulted at Warwick, between about 6.48 p.m. and 7.28 p.m.

When the Moon rises on the 12th it will be interesting to notice the nearness of the bright planet Jupiter, somewhat higher and to the left of it.

An occultation of Ki Arietis will take place on the 15th, between 4 a.m. and 4.30 a.m. This occultation will take place somewhat earlier and last longer at Rockhampton.

On the 16th the remarkably close conjunction of Mercury and Mars will be barely observable without binoculars or telescope low down in the east, about an hour before sunrise.

Omega Tauri will be occulted on the 17th, between about 3.25 a.m. and 4.10 a.m., in Southern Queensland

Jupiter will be in opposition to the Sun on the 22nd, and its distance from the earth reduced to about 290 million miles.

On the 23rd the Sun will rise almost directly due east and set due west. An interesting daylight view may be obtained on the 23rd by anyone with keen eyes who can get the Sun shielded off by a building or good dark object, when Venus should be seen not far off to the west and the crescent Moon still further to the north-west. Uranus will be in the constellation Pisces near Jupiter, and Neptune in Leo near Regulus.

4 Oct.	☾	First Quarter	12	1 p.m.
11 „	○	Full Moon	7	14 a.m.
18 „	☽	Last Quarter	12	31 a.m.
26 „	●	New Moon	1	37 a.m.

Perigee 11th October, at 1 24 p.m.
Apogee 25th October, at 11 48 a.m.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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